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THE HINTON GLYCEROL-CHOLESTEROL PRECIPITATION TEST

A Comparison With The Wassermann, Kahn and Slide Tests in Sixteen Hundred Cases*

BY AUSTIN W. CHEEVER, M.D.,† AND RUSSELL L. SPLAINE, M.D.†

HINTON[1] recently described a new precipitation test for which he claimed superior value in the diagnosis of syphilis and in the management of its treatment. It therefore seemed desirable to us to make a clinical study of the use of his test in comparison with other serum tests for syphilis. At present the two methods most frequently used in America, in this connection, are the Wassermann[2] with its numerous modifications, and the Kahn[3]. Recently Kline and Young[4] have described a very simple technique, referred to in this paper as the Slide Test, which should appeal to both laboratory worker and clinician because of the comparative ease with which it may be performed.

Consequently each of these methods was routinely applied on first admission to every patient in the Medical, Gynaecological, Genito-Urinary and Dermatological Departments of the Boston Dispensary, and to patients selected arbitrarily by other departments. Those patients who had a positive Wassermann, or any other evidence of syphilis, were routinely referred to the Skin Department.

Soon after beginning this investigation it was found that the results by the various methods frequently differed. For this reason a follow-up system was initiated whereby the patients were summoned to the Dispensary for additional blood tests. The four methods were repeated on the new samples of blood obtained. Occasionally patients were summoned several times for such repetitions in order to exclude, if possible, technical errors in the individual methods.

The four methods compared in this study were executed in the laboratory of the Boston Dispensary, under the direction of Dr. William A. Hinton. In the Wassermann test[2] the antigens were three in number, the first being a cholesterinized alcoholic extract of guinea-pig heart and the other two cholesterinized alcoholic extracts of human heart. Two units of complement and two units of amboceptor were used with 0.5 c.c. of 5 per cent. suspension of sheep's corpuscles as the hemolytic system.

The Kahn test was executed as described by Kahn[3]. The antigen used in his test was prepared from the dry ground powder of beef heart muscle as obtained from the Difco Company of Detroit. The quantities used for the test were in strict accordance with the titres which he described.

The Slide test of Kline and Young[4,5] was performed with the Kahn antigen which was used in the Kahn test. One drop of the diluted antigen was mixed with 0.05 c.c. of serum on a slide at room temperature and examined with a 16 mm. objective.

Hinton's Glycerol Cholesterol test was performed as follows: His "indicator," commonly called antigen, consisted of a mixture of one part of the ether-insoluble, alcohol-soluble fraction of beefsteak muscle and 9 parts of a 0.7% solution of cholesterol in absolute alcohol. A sufficient quantity of this indicator was diluted freshly each day, first with 2 parts and then 12 parts of a 5% solution of sodium chloride. The mixture was thoroughly shaken after each addition of salt solution. To this 15 parts of a 50% solution of redistilled glycerine in distilled water were added. Finally the whole mixture was thoroughly shaken and 0.5 c.c. of it added to the three tubes for each test, which contained respectively 0.1 c.c., 0.2 c.c. and 0.3 c.c. of serum. The tests were incubated for 16 to 18 hours in a water bath at 27 degrees Centigrade, after which the readings were made. The specimens which showed a weakly positive reaction in the 0.2 c.c. and 0.3 c.c. amount were reported as positive. Those which showed a weak reaction in the 0.3 c.c. amount only were reported as negative. Those which showed a moderately positive reaction or a strongly positive reaction in any or all of the tubes were reported as positive.

Since this paper was written, Hinton has increased the accuracy of his reaction and has made it more sensitive by the following modifications:

(1) The temperature of incubation has been changed to 37 degrees C.;
(2) The amounts of serum have been changed so that each test is made with 0.1 c.c., 0.3 c.c. and 0.5 c.c. of serum;
(3) He uses a 5% solution of sodium chloride for mixing the indicator which he uses in the 0.1 c.c. amount of serum and a 3% solution of sodium chloride for mixing the indicator for use with the 0.3 c.c. and 0.5 c.c. amounts of serum.
(4) His criterion of a positive reaction is no longer a clearing of the suspension but a more certain and visible characteristic,—the agglutination of the cholesterol particles of his indicator.

He is now preparing for publication detailed description of these modifications.

*From the Division of Clinical Research and the Department of Dermatology and Syphilis of the Boston Dispensary.

†For record and address of author see "This Week's Issue," page 1006.

The results of the tests were reported in conformity with the directions given by their respective authors. It should be stated, however, that a single plus reaction by the Slide test was reported as doubtful while stronger reactions were regarded as positive. The tests were reported in each instance as positive, negative, and doubtful, with the exception of the Hinton test, which was reported either as positive or negative. As will be shown consistently throughout the tables, a doubtful group was unnecessary for the Hinton, but this did not prevail in the other methods.

The results reported are based on a study of 1610 patients, from each of whom at least one specimen of blood was taken—sometimes several—and examined each time by all four methods. These cases were readily divided into three

TABLE I

		No. of patients	No. of exams.
Group I (Syphilis)			
(A)	All tests positive	126	168
(B)	All tests negative	108	137
(C)	Discrepant tests	199	455
	Totals	433	760
Group II (Non-Syphilis)			
(A)	All tests negative	1110	1127
(B)	Discrepant tests	55	103
	Totals	1165	1230
Group III (? Syphilis)			
(A)	All tests negative	6	12
(B)	Discrepant tests	6	24
	Totals	12	36
	Grand Total	1610	2036

GROUP I

Group I consists of 433 cases of syphilis, (760 examinations of blood by each method) subdivided into three sub-groups A, B, and C according to the results reported:

A. consists of 126 cases (168 examinations of blood by each method), all of which were positive whenever tested.

B. consists of 108 cases (137 examinations by each method), all of which were negative whenever tested. Of these, 87 were cases in which a question of cure was involved; 21 in which treatment had been begun at the Dispensary in the primary stage of the disease and in which all tests had become negative as the result of it.

C. consists of 199 cases (455 examinations by each method), all of which gave discrepant results.

Because this paper is a comparison of the four methods—Wassermann, Kahn, Slide, and Hinton Tests—our discussion will center largely around the discrepant groups shown in Table I. (IC, IIB and IIIB.)

TABLE II

(Group I—Subgroup C. Discrepant Tests in 199 Cases of Syphilis)

		Pos.	Neg.	Dbt.	Omitted	Cases	Exams.
1. All methods positive at least once during the study.	Wassermann	135	20	32	0	77	187
	Kahn	106	59	14	8		187
	Slide	129	29	13	16		187
	Hinton	171	15	0	1		187
2. Persistently negative Wassermann; 1 or more other methods positive.	Wassermann	0	134	0	0	60	134
	Kahn	13	107	11	3		134
	Slide	30	72	18	14		134
	Hinton	81	53	0	0		134
3. Persistently negative Kahn; 1 or more other methods positive.	Wassermann	34	11	21	0	31	66
	Kahn	0	66	0	0		66
	Slide	27	22	12	5		66
	Hinton	52	13	0	1		66
4. Persistently negative Hinton; 1 or more other methods positive or negative.	Wassermann	3	1	5	0	4	9
	Kahn	5	4	0	0		9
	Slide	4	5	0	0		9
	Hinton	0	9	0	0		9
5. Persistently positive Hinton; other methods differ.	Wassermann	3	6	5	0	7	14
	Kahn	7	7	0	0		14
	Slide	3	4	4	3		14
	Hinton	14	0	0	0		14
6. Unclassified.	Wassermann	14	14	17	0	20	45
	Kahn	0	29	16	0		45
	Slide	7	24	7	7		45
	Hinton	24	21	0	0		45
						199	455

This sub-group of 199 cases in Table II, in which there were discrepant results, represents 45 per cent. of all the cases diagnosed as syphilis, which is 12 per cent. of the total 1610 cases studied.

Subdivision 1 consists of 77 cases of syphilis (187 examinations by each method). In each case all the methods gave a positive reaction at least once during the study. The Hinton test shows the most positive, the least negative and no doubtful reactions.

Since there were so few negative reactions by the Hinton method, it seemed desirable to restudy them. The fifteen negative tests involved 13 patients. Two (No. 1 and No. 2) gave negative reactions with all the methods on first examination with the exception of a positive in the Slide. They were consistently positive with all other tests thereafter, including the Hinton. The protocols follow:

CASE No. 1 (B. D. No. 263669)

Patient came to the Boston Dispensary April 30, 1927, with a penile primary, at which time the Wassermann was positive. Arsenical treatment was then begun. The results of the subsequent comparative tests are as follows:

	Wassermann	Kahn	Slide	Hinton
6-29-27	—	—	—	—
9-12-27	+	+	+	+
9-15-27	+	+	+	+
10-3-27	+	+	+	+

CASE No. 2 (B. D. No. 267725)

Patient came to the Dispensary August 8, 1927, with a history of a penile sore of 15 days' duration. The darkfield was positive. Physical examination showed a general adenopathy.

	Wassermann	Kahn	Slide	Hinton
8-8-27	—	—	+	—
8-10-27	+	+	+	+

CASE No. 3 (B. D. No. 267124)

Patient had a secondary rash in May, 1927. Physical examination disclosed a general adenopathy. A darkfield examination of the primary lesion was negative and the Wassermann was positive. Patient received 6 gm. arsphenamine between 7-18-27 and 9-21-27.

	Wassermann	Kahn	Slide	Hinton
7-18-27	+	+	+	+
8-5-27	+	+	+	+
9-21-27	—	+	0	—

CASE No. 4 (B. D. No. 267982)

Patient admitted June, 1927, with a sore throat, roseola, and a general adenopathy. Patient also had acute gonorrhea. Previous to the tests shown below, 4 injections of arsphenamine, totaling 1.3 gm., had been given.

	Wassermann	Kahn	Slide	Hinton
8-20-27	+	+	+	+
9-12-27	—	—	+	—

CASE No. 5 (B. D. No. 266384)

In June, 1924, patient had a labial chancre and a general maculo-papular rash over the body. The darkfield was positive. Treatment with arsphenamine was begun immediately. The following are the results of the serologic examinations:

	Wassermann	Kahn	Slide	Hinton
7-22-27	+	+	+	—
7-27-27	+	+	+	+
9-10-27	±	—	—	—

CASE No. 6 (B. D. No. 267147)

Patient admitted with a penile primary, July, 1927. Darkfield examination was positive.

	Wassermann	Kahn	Slide	Hinton
7-19-27	+	+	+	+
7-22-27	+	+	+	+
8-5-27	—	+	+	+
10-3-27	—	—	—	—

CASE No. 7 (B. D. No. 266507)

Secondary syphilitic under treatment.

	Wassermann	Kahn	Slide	Hinton
6-28-27	+	+	+	+
7-8-27	+	—	+	—

CASE No. 8 (B. D. No. 222796)

A case of secondary syphilis under treatment.

	Wassermann	Kahn	Slide	Hinton
7-20-27	±	—	—	+
8-18-27	+	+	+	—

CASE No. 9 (B. D. No. 163868)

Patient with late syphilis whose blood gave a negative reaction by all the methods after two years of routine treatment; this same case four months later gave positive tests by each method.

	Wassermann	Kahn	Slide	Hinton
6-16-27	—	—	—	—
10-17-27	+	+	+	+

CASE No. 10 (B. D. No. 203759)

Patient with late syphilis whose tests gave negative Slide and Hinton tests on first examination, doubtful Kahn and positive Wassermann. Subsequent tests on this case were all positive except for the Slide.

	Wassermann	Kahn	Slide	Hinton
7-22-27	+	±	—	—
8-18-27	+	+	—	+
10-14-27	+	+	+	+

CASE No. 11 (B. D. No. 264284)

Patient with late treated syphilis, sluggish pupils and characteristic girdle sensation, whose blood gave a negative Kahn and Hinton on the first examination, and positive Wassermann and Slide. Two and one-half months later both Hinton and Kahn were positive while the Wassermann was doubtful. Patient had received ten treatments of arsphenamine, totaling 3.2 gm., during the interval.

	Wassermann	Kahn	Slide	Hinton
7-8-27	+	—	+	—
9-28-27	±	+	0	+

CASE No. 12 (B. D. No. 244284)

Patient with late syphilis. On examination 6-20-27 all tests were positive; three months later, all tests were negative.

	Wassermann	Kahn	Slide	Hinton
6-20-27	+	+	+	+
9-28-27	—	—	0	—

At weekly intervals during this period, patient received a total of 8 gm. sodium thiosulphate. Previous to 6-20-27, 7 gm. of arsphenamine had been administered.

CASE No. 13 B. D. No. 267449)

Patient with late syphilis whose blood gave a negative Hinton reaction on the first two examinations and a positive on the third. The other methods were consistently positive.

	Wassermann	Kahn	Slide	Hinton
8-1-27	+	+	+	—
8-6-27	+	+	+	—
8-27-27	+	+	+	+

Thus we see that in no instance did the Hinton reaction fail persistently in any of these cases of syphilis. In three of the cases it was negative when all the other methods were negative. In two other cases it was negative when only the Slide test was positive. In one case it was negative when the Kahn was doubtful; in one case negative when only the Slide was doubtful and so on, indicating that it does not stand alone in giving a false negative reaction. In the other 64 cases the Hinton was positive in every instance, whereas the other methods varied very much in the same way, as the protocols illustrate.

Subdivision 2 where the grouping was "Persistently negative Wassermann; one or more other methods positive", we see the results still in favor of the Hinton. Here are 60 cases that would have been missed if the Wassermann test alone had been done.

Subdivision 3 where the grouping was "Persistently negative Kahn; one or more other methods positive", the Hinton test shows a much larger number of positive reactions than the Slide or the Wassermann. Here 31 cases would have been missed if our sole dependence had been the Kahn.

Subdivision 4 where the grouping was "Persistently negative Hinton; one or more other methods positive or negative", the four cases are evidently definite failures of the Hinton test, but they should be compared with the failures in subdivisions No. 2 and No. 3 where 60 cases would have been missed by the Wassermann alone and 31 cases by the Kahn alone.

Sudivision 5. In these seven cases the grouping was "Persistently positive Hinton; other methods differ". Table No. II showed the results.

Subdivision 6. "Unclassified". There were no positive Kahns, 7 positive Slides, 14 positive Wassermanns and 24 positive Hintons.

For the purpose of clarity we shall tabulate these discrepant tests, involving 199 patients, in Table No. III.

TABLE III

TOTALS OF DISCREPANT TESTS ON 199 SYPHILITIC PATIENTS

	Pos.	Neg.	Dbt.	Omitted	Exams.
Wassermann	189	186	80	0	455
Kahn	131	272	41	11	455
Slide	200	156	54	45	455
Hinton	342	111	0	2	455

The tabulation above shows that the Hinton gave the most positive reactions (342 positives in a possible 455) and the fewest negatives. These were all cases of syphilis which were under treatment during the period of study (five months).

GROUP II

Group II consists of 1165 cases with neither history nor clinical evidence of syphilis (1230 examinations of blood by each of the four methods). In 1110 of these cases all the tests were negative. On the other hand in 55 cases, which will be shown in Table No. IV, the separate methods gave discrepant reactions.

TABLE IV

TOTALS OF DISCREPANT TESTS ON 55 NON-SYPHILITIC PATIENTS

	Pos.	Neg.	Dbt.	Omitted	Exams.
Wassermann	7	53	42	1	103
Kahn	2	93	4	4	103
Slide	12	74	10	7	103
Hinton	2	100	0	1	103

From this table, it is seen that the Wassermann gave 7 false positive reactions, the Kahn 2, the Slide 12 and the Hinton 2. One of these false positives by the Hinton method was a weak reaction in a patient with acne. On repetition the reaction was negative. The second case gave two negative reactions following the single false positive.

GROUP III

Besides these two main groups of cases there was a third group of 12 in which it was impossible either to exclude or diagnose syphilis. In 6 of the 12 cases all the methods gave consistently negative reactions.

There were four cases in this group which we shall list separately as follows:

B. D. No. 17984. A patient 70 years old, complaining of gastric symptoms. On 4 separate occasions the Hinton was positive and on one occasion the Kahn was positive. All other tests were negative.

	WR	K	S	Hin.
7-8-27	—	+	—	+
8-6-27	—	—	—	+
8-13-27	—	0	—	+
9-3-27	—	—	—	+

B. D. No. 266344. Negro, 49 years of age, with left-sided paralysis of larynx together with obvious tuberculosis, of which he died. The Hinton was positive, other methods negative.	6-25-27	—	—	—	+
B. D. No. 267848. Woman, 28 years of age, came for a "blood test". She had had miscarriages. Hinton reaction was positive; all other tests negative.	8-12-27	—	0	—	+
B. D. No. 266864. This patient had gonorrhea. All tests were negative except the Hinton, which showed a weak reaction.	7-6-27	—	—	—	+

In the last three cases it was impossible to obtain a follow-up and consequently impossible to determine the presence or absence of syphilis.

At this point it is well to demonstrate the consistent way in which the Hinton reaction manifests itself. For this purpose we shall introduce the last 2 cases in this group, 6 year-old twins. (BD. No. 268338 and BD. No. 267771.) The clinical diagnoses in these cases are not certain. The most suggestive evidence of syphilis is an inconsistency by each of the other methods. The protocols follow, together with a short statement of their clinical symptoms. We do not believe that these children have syphilis, but we could not exclude the disease.

B. D. No. 268338				B. D. No. 267771			
WR	K	S	Hin.	WR	K	S	Hin.
+	0	0	—	±	0	0	0
±	—	—	—	+	—	—	—
—	—	±	—	±	—	+	—
±	+	±	—	—	±	+	—
—	—	+	—	±	+	—	—
±	—	—	—	±	—	+	—
—	—	—	—	—	+	—	—
±	+	—	—	±	—	—	—
				—	—	—	—

Lower incisors (permanent) corrugated. Upper infantile teeth stubby. Cervical nodes. Some irregular contour both tibiae.

Bridge of nose widened. Slight inversion of eyes. Enlarged tonsils. Cervical axillary and inguinal nodes palpable. Interstitial keratitis.

SUMMARY

1610 cases were studied both clinically and serologically; 260 cases (560 examinations of blood by each of four methods) showed discrepant reactions, among which the Hinton test showed the largest number of positives in the known syphilitics and as few false positives in the non-syphilitics as any of the other methods.

CONCLUSION

On the basis of this study, we believe the Hinton to be a much more sensitive test for syphilis than the Wassermann, the Kahn, or the Slide test of Kline and Young.

BIBLIOGRAPHY

1 Hinton, W. A.: A Glycerol-Cholesterol Precipitation Reaction in Syphilis. B. M. and S. J., 196:993, June 16, 1927.
2 Hinton, W. A.: A Standardized Method of Performing the Wassermann Reaction. A. J. Syphilis, Vol. IV: No. 4, pp. 155-160, Oct., 1926.
3 Kahn, R. L.: Serum Diagnosis of Syphilis by Precipitation. Williams and Wilkins Co., Baltimore, 1925.
4 Kline, B. S., and Young, A. M.: A Microscopic Slide Precipitation Test for Syphilis. Jour. of Lab. and Clinical Med., Vol. XII, No. 5, p. 477, Feb., 1927.

THE HINTON GLYCEROL-CHOLESTEROL PRECIPITATION REACTION*

A Diagnostic Criterion of Syphilis

BY R. L. SPLAINE, M.D.,† AND A. W. CHEEVER, M.D.†

THE medical profession as a whole rely upon serologic tests as important diagnostic criteria of syphilis. The Wassermann test[1] because of its long, widespread usage, and its proven value, is looked upon as the important aid in the diagnosis of this disease. Recently, Hinton[2] described a new test which he believed had superior value to the Wassermann reaction. Consequently, we have studied 1610 cases in which we have compared the results of both the Wassermann and Hinton tests.

Of these 1610 cases, 1177 were clinically and serologically non-syphilitic.

Four-hundred and twenty-three (423) cases upon which this paper is based were syphilitic. These were studied clinically in the Skin Department. Ten (10) cases could not be classified on account of inadequate history or failure of follow-up.

We have classified these 423 cases of syphilis into primary, secondary (including intermediate), asymptomatic, late, congenital and central nervous system syphilis.

For the purposes of classification in this paper we have called cases primary syphilis or secondary syphilis if they were admitted to the Dispensary with symptoms characteristic of these stages of the disease. Consequently in the tables which follow, all cases admitted in either of these stages are so designated in spite of the fact that most of them have been treated,—some for less than six months and others for a longer period of time. We shall discuss the different stages of syphilis in the order given in our classification above.

PRIMARY SYPHILIS

In a group of 89 cases of clinical primary syphilis, 17 of which were of less than 6 months'

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†For record and address of author see "This Week's Issue," page 1006.

duration, 72 of more than 6 months, the following results were obtained:

		Hinton tests	Wassermann tests
Group I. (17 patients) (Less than 6 mos. duration)	Pos.	24	20
	Neg.	13	17
	Dbt.	0	0
		37	37

		Hinton tests	Wassermann tests
Group II. (72 patients) (More than 6 mos. duration)	Pos.	46	33
	Neg.	61	70
	Dbt.	0	5
	Not done	1	0
		108	108

In Group I above, we have 17 cases of primary syphilis, (less than 6 months' duration), 16 of which had positive darkfields.

In eleven of these cases, of from 2-6 weeks' duration, both methods were consistently positive.

In four cases, both methods were and remained negative.

In one case, of 3 weeks' duration, the Hinton test alone was positive in three consecutive tests at weekly intervals.

In one case, both tests were negative the first examination, 2 days later both tests were positive.

SECONDARY SYPHILIS (INTERMEDIATE INCLUDED)

In a group of 99 cases of clinical secondary syphilis, 27 of which were of less than 6 months, and 72 of more than 6 months' duration, the following results were obtained:

		Hinton tests	Wassermann tests
Group I. (27 patients) (Less than 6 mos. duration)	Pos.	41	42
	Neg.	24	22
	Dbt.	0	2
	Not done	1	0
		66	66

		Hinton tests	Wassermann tests
Group II. (72 patients) (More than 6 mos. duration)	Pos.	59	41
	Neg.	49	61
	Dbt.	0	7
	Not done	1	0
		109	109

In Group I, where the duration of the disease was less than 6 months (a varying amount of treatment having been given in the interval) the Hinton and the Wassermann gave essentially the same results, (the Wassermann giving one more position reaction). On the other hand in Group II, the Hinton gave a larger number of positives than the Wassermann. These were the patients to whom more treatment had been given and who were obviously more refractory to it.

ASYMPTOMATIC SYPHILIS

A similar discussion can be applied to this group of 147 cases of asymptomatic syphilis. The majority of these patients were in that stage of syphilis in which serologic tests are our most important criteria and here the Hinton test again demonstrated its increased sensitiveness, as shown by nearly twice as many positive tests.

		Hinton tests	Wassermann tests
Asymptomatic Syphilis (147 patients)	Pos.	201	133
	Neg.	70	95
	Dbt.	0	45
	Not done	2	0
		273	273

LATE SYPHILIS

In a group of 31 patients under treatment for late syphilis the increased sensitiveness of the Hinton is again shown in the following tables:

		Hinton tests	Wassermann tests
Late Syphilis (31 patients)	Pos.	45	24
	Neg.	7	22
	Dbt.	0	6
		52	52

CONGENITAL SYPHILIS

In a group of 13 cases of congenital syphilis under treatment, the following results were obtained:

		Hinton tests	Wassermann tests
Congenital Syphilis (13 patients)	Pos.	14	12
	Neg.	8	7
	Dbt.	0	3
		22	22

SYPHILIS OF THE CENTRAL NERVOUS SYSTEM

In this group we are dealing with those who oftentimes give the neurologist much trouble in arriving at a correct diagnosis. We have included in the following table 44 cases where the central nervous system has been involved. They are all under treatment. The marked increase in sensitiveness of the Hinton is shown in the table.

		Hinton tests	Wassermann tests
Syphilis of the Central Nervous System (44 patients)	Pos.	53	27
	Neg.	17	33
	Dbt.	0	10
		70	70

To illustrate the usefulness of this increased sensitiveness in the diagnosis of actual cases the following three are cited:

CASE I. Female 21 years.

History of "eye trouble" at age of 10, at which time the patient was relieved by 2 years of anti-luetic treatment.

No disturbance of any kind occurred until 3 months ago, when a diagnosis of interstitial keratitis was made despite more than 2 negative Wassermanns. Two provocative arsphenamine injections were given. The Wassermann remained negative. The blood was then tested by the Hinton method and found *positive.*

CASE II. Anna M. Age, 6 years.

At 4 years of age the child developed interstitial keratitis. The Wassermann was negative. The condition subsided and left but scars. When seen in our clinic 2 years later the scars of the interstitial keratitis were present and examination of the blood showed a positive Hinton test and the Wassermann was still negative.

CASE III. Male 44 years.

Complaint—headaches; gonorrhea 14 years ago; no history of primary sore; no history of alcoholism. The only physical sign was *Argyll Robertson pupils.* Hinton test positive. Wassermann negative.

Hinton has encountered a very few cases of syphilis where the Wassermann was positive and his reaction was negative. They are as follows: 2 patients with acute infections where his test was positive and the Wassermann doubtful, and in which no signs of syphilis were found post-mortem. These were cases of fatal septicemia. *On the other hand,* he has had 2 cases, one of tuberculous meningitis and one of pneumonia, in which the Wassermanns were positive (in the former both blood and spinal fluid) and in which his test was negative. The case with meningitis was confirmed by autopsy as being of tuberculous origin. The other case gave negative Wassermann as well as no history of the disease on later examination. In our present series of cases, we have encountered only 2 false positive reactions in a total of 1610 cases, of which 423 were clinically and serologically syphilitic.

CONCLUSIONS

(1) In the primary stage of syphilis the value of the Hinton reaction is but slightly better than the Wassermann.

(2) In the largest group of this series, that of asymptomatic syphilis, where one must be guided either by serologic tests or a less certain factor—judgment—we feel that the demonstrated increase of 50% in sensitiveness and the practical absence of false positives in the Hinton test make it a truly superior diagnostic criterion of syphilis.

BIBLIOGRAPHY

1 Hinton, W. A.: A Standardized Method of Performing the Wassermann Reaction. A. J. Syphilis, Vol. IV: No. 4, pp. 155-160, Oct., 1920.
2 Hinton, W. A.: A Glycerol-Cholesterol Precipitation Reaction in Syphilis. B. M. and S. J., 196:993, June 16, 1927.

THE HINTON GLYCEROL-CHOLESTEROL PRECIPITATION REACTION AS A MEANS OF INDICATING THE NECESSITY OF CONTINUED TREATMENT*

BY A. W. CHEEVER, M.D.† AND R. L. SPLAINE, M.D.†

HAVING diagnosed syphilis, the physician must not only choose the therapeutic methods to effect cure, but he must have some means of judging when this is accomplished. At present the criteria are: continued absence of clinical signs, persistently negative laboratory tests, negative tissue transfer, and reinfection, which, of course, cannot be used on man. None of these is infallible. The most universally used laboratory test in this connection is the Wassermann reaction and its modifications. From an experience of more than twenty years, physicians in all parts of the world now realize that although the Wassermann reaction is one of the best tests used in clinical practice, it is far from a satisfactory criterion of cure even when both blood and spinal fluid show negative results by it. In consequence of this fact, an examination of the spinal fluid by other tests is considered a necessary adjunct. This usually includes a gold curve or some of its modifications, a cell count, and an estimation of globulin and total protein. A negative reaction by all of these tests is usually considered necessary before the patient is judged cured and even then an occasional relapse will occur.

During a study of the diagnostic value of the Hinton reaction in syphilis[1,2], it occurred to us that this test might be of greater worth in determining cure because in that study the Hinton reaction was far more sensitive in the detection of syphilis than the other tests with which it was compared. Accordingly, we selected 433 cases of syphilis with the idea of investigating the adequacy of the Hinton[3] reaction as a criterion of cure. On 423 of these cases two or more blood examinations were made, including both Hinton and Wassermann tests, on each sample of blood. Table I gives the results thus obtained. In the vertical columns we shall refer to consistently positive, (Con. Pos.) consistently negative, (Con. Neg.) consistently doubtful (Con. Dbt.) and to inconsistent reactions. This indicates that these cases gave consistently positive, negative or doubtful reactions upon repetition during the period of this investigation (6 months). As many as eight Wassermann and eight Hinton tests were done on some of the patients. In the inconsistent column we refer

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to a variation in the reaction on the blood of the same patient when it was obtained and examined at different times by the method indicated. For example, in Group IV there were seven patients whose tests showed inconsistent Wassermann reactions, viz: the first examination of case No. 264710, late syphilis, gave a negative reaction; the second examination, 4 weeks later, a positive reaction; the third, after an additional 4 weeks, a doubtful reaction, etc.

TABLE I

	Con. Pos.	Con. Neg.	Con. Dbt.	In-complete	In-consistent	No. of cases
Group I.						
Primary						
Wassermann	29	50	2	0	8	89
Hinton	35	45	0	1	8	
Group II.						
Secondary						
Wassermann	38	47	0	0	14	99
Hinton	48	40	0	1	10	
Group III.						
Asymptomatic						
Wassermann	62	44	8	0	33	147
Hinton	98	32	0	2	15	
Group IV.						
Late						
Wassermann	15	7	2	0	7	31
Hinton	24	3	0	0	4	
Group V.						
Neurosyphilis						
Wassermann	17	15	3	0	9	44
Hinton	31	9	0	0	4	
Group VI.						
Congenital						
Wassermann	7	3	1	0	2	13
Hinton	8	4	0	0	1	
Total cases						423

In this table we have used a conventional classification. The stage of the disease shown refers to the stage at which the patient began his treatment at the Dispensary. All of these cases have been rather vigorously treated according to a fairly fixed plan, which was as follows:

> In primary and early secondary syphilis arsphenamine injections (averaging 0.35 gm. each) were given three times a week for two weeks, then twice a week for two weeks, then once a week to a total of sixteen, followed by sixteen weekly injections of iodobismuthate of quinine (averaging 0.3 gm. each) or bichloride of mercury in a palmitin base (averaging 0.13 gm. each). Regardless of the result of the Wassermann a second milder course was given, consisting of twelve arsphenamine and twelve bismuth or mercury injections. This milder course was repeated until at least one course was given after the first negative Wassermann reaction. Late secondary, many asymptomatic and late cases, and congenital cases of syphilis were treated with courses approximating this more moderate type though many were individualized. Neurosyphilis was treated largely with tryparsamide; the doses averaged 3.0 gm. and were continued until clinical and serologic improvement was satisfactory.

In Group I, consisting of 89 cases in which treatment was begun at the Dispensary in the primary stage of the disease, there were 29 patients whose Wassermann tests were consistently positive and 35 patients whose Hinton tests were consistently positive. Thus it will be seen that in Group I there were 6 more patients who showed consistently positive Hinton reactions out of a total of 89 syphilitics whose treatment began here in the primary stage of the disease.

In Group II, secondary syphilis, there were 10 more patients whose blood showed consistently positive Hintons than patients whose blood showed consistently positive Wassermann tests.

In Group III, asymptomatic syphilis, there were 36 more patients with consistently positive Hintons than patients with consistently positive Wassermanns. This is the most important group because our serologic findings are our safest, often our only criteria.

In Group IV, patients who came to the Dispensary suffering from late manifestations of the disease, the Hinton test showed 9 more consistently positive cases in a total of 31 than did the Wassermann.

In Group V, patients whose symptoms were referable to the central nervous system, there were 14 more cases with consistently positive Hintons than cases with consistently positive Wassermanns—almost twice as many for this group of 44 as was shown by the Wassermann reaction.

In Group VI, the congenital syphilitics, there was no demonstrated increase in sensitiveness of the Hinton reaction as compared with the Wassermann. No conclusions can be drawn from such a small number of cases.

We have selected a few cases to illustrate how the increased sensitiveness of the Hinton reaction has indicated the necessity of further treatment.

Case No. 185362, a teamster 50 years old, with a history of having had abundant anti-syphilitic treatment, first came to the Dispensary in 1921. The laboratory findings had been positive in blood and spinal fluid. During the past 6 years, while under treatment at the Dispensary, he received vigorous anti-syphilitic medication, consisting of arsphenamine, sulpharsphenamine, bismuth, and mercury. His later Wassermanns were negative. A lumbar puncture performed March 16, 1927, showed all laboratory findings negative except a slightly increased total protein in the spinal fluid. Neurologic examination at this time showed small pupils which reacted very slightly, together with coarse tremors of the head and hands. His Hinton reaction was positive in June, September and October, 1927. In view of these findings, both clinical and serological, one would not question the advisability of further anti-syphilitic treatment.

CASE No. 184053. A married woman, 41 years of age, came to the Dispensary January 22, 1921, complaining of ringing in the ears and dizzy spells. A diagnosis of syphilis was made in May, 1922, and at this time the Wassermann was positive. Antisyphilitic treatment was then begun, consisting largely of bismuth and sulpharsphenamine. The Wassermann reaction became negative for the first time in January, 1925. Neurologic examination June 20, 1927, showed a negative Wassermann on spinal fluid, a positive gold curve (322211----), a cell count of 5 and a total protein of 47. A clinical note at this time states that there were symptoms indicating moderate involvement of the central nervous system. The gold curve was therefore the only positive laboratory evidence of syphilis. There have been eight consecutive negative Wassermanns, the latest in September of 1927; at this time and in June of the same year the Hinton reaction was positive. Without question no syphilologist would hesitate to continue treatment in the face of even these mild symptoms of neurosyphilis.

CASE No. 233374. A single man of 31 came to the Dispensary, August, 1924, with a history of having had a secondary rash and having been treated by a local physician with 7 injections of arsphenamine. Patient was vigorously treated here with arsphenamine, mercury, and more recently with tryparsamide. His Wassermann reaction became negative August, 1926, and the blood remained so. A lumbar puncture March 15, 1927, showed a positive Wassermann, cell count of 79, a positive gold test and a statement on the record that the clinical findings were suggestive of a meningo-parenchymatous lesion and that tryparsamide should be started at once. This case showed a positive Hinton and a negative blood Wassermann.

CASE No. 50824. A single man, 45 years of age, began treatment, vigorous at times, at the Dispensary in 1913. To July, 1926, he received 80 injections of arsphenamine, 74 of mercury and 35 of bismuth. His Wassermann was negative. Neurologic examination including a lumbar puncture showed a meningovascular syphilis which had been improved by antisyphilitic treatment. The gold curve was of the tabetic type; the total protein was 57; the other findings were essentially negative. The Hinton reaction was positive,—this being in support of both the clinical and the laboratory findings as disclosed by spinal fluid examination.

A positive reaction on blood or spinal fluid in very thoroughly treated cases without clinical symptoms always raises the perplexing problem as to whether or not this positive reaction is a scar of the disease rather than an indication of the existence of the living treponema pallidum in the patient. We cannot answer this question dogmatically, but the cases cited above demonstrate that the more sensitive Hinton reaction has, when taken with the clinical symptoms, indicated the necessity of further treatment.

CONCLUSION

From the data at hand we feel convinced that a negative Hinton reaction is a safer criterion of cure than a negative Wassermann reaction on the blood.

BIBLIOGRAPHY

1 Splaine, R. L.,—Cheever, A. W.: "The Hinton Glycerol-Cholesterol Precipitation Reaction. A Diagnostic Criterion of Syphilis." N. E. J. of M., 199, 971, Nov. 15, 1928.

2 Cheever, A. W.—Splaine, R. L.: "The Hinton Glycerol-Cholesterol Precipitation Test. A Comparison with the Wassermann, Kahn, and Slide Tests in Sixteen Hundred Cases." N. E. J. of M., 199, 967, Nov. 15, 1928.

3 Hinton, W. A.: "A Glycerol-Cholesterol Precipitation Reaction in Syphilis." B. M. and S. J., 196:993, June 16, 1927.

SYMPOSIUM ON ASPHYXIA AND RESUSCITATION

ON the evening of May 1, 1928, a meeting of physiologists, anesthetists and obstetricians was held at the office of Dr. Nathaniel R. Mason at 483 Beacon Street, Boston.

Various methods of resuscitation in cases of asphyxia were considered.

The papers and discussions follow.

APPARATUS FOR RESUSCITATION

A new device for producing artificial respiration, was demonstrated by Mr. Zellenka. This device consists of a leather shield, padded with sponge rubber around the edges, which is strapped tightly over the thorax and abdomen of the patient. A motor-driven pump makes positive and negative pressures within the shield when the operator turns the handle on the top of the driving mechanism through an arc of 90 degrees. The arrangement of the apparatus is shown in the accompanying illustration.

The Apparatus of Dr. Rudolf Eisenmenger.

It would seem impossible to devise a shield which could be made to fit tightly enough to the body to give efficient respiration. However, careful examination of the Eisenmenger apparatus indicates that while the shield is never absolutely tight, it is close-fitting enough to permit exerting quite strong positive and negative pressures and so to give very good pulmonary ventilation.

In a long article in the *Wiener medizinische Wochenschrift**, entitled "Resuscitation through Simultaneous Artificial Respiration, Artificial Promotion of Circulation, and Heart Massage," Dr. Eisenmenger presents a discussion of the possible effects of his apparatus in promoting circulation. It is his contention that the abdominal pressure incident to the positive phase of the action of the apparatus forces blood toward the heart, and that on the suction phase the abdominal vessels are again filled. These contentions are to a certain degree true, but it is not safe to add to them, as Dr. Eisenmenger does, the claim that these effects upon the blood stream go further and actually drive blood through the heart and through both circulations.

A miniature appliance of the same general type is provided for use with new-born babies.

At the present time the single example of the Eisenmenger appliance in the United States is in the possession of Mr. Philipp W. Zellenka, 229 West 78th Street, New York City, and no arrangements for sale or distribution in the country have as yet been made. The appliance may well become a useful hospital aid for dealing with cases requiring long periods of artificial respiration. It is somewhat fragile and cumbersome, and is not well adapted for field use by public utility companies, police, firemen, etc.

*May 12, 1928, Volume 78 (No. 20), pages 634-638.

Dr. Francis D. Donoghue read the lecture delivered at the Physiological Society of Berlin on November 25, 1927 by Professor Rudolf Eisenmenger of Vienna giving in full the subject matter abstracted above.

Dr. Yandell Henderson was presented by the host, who said: "It gives me very great delight, gentlemen, to welcome here a man of eminence as a physiologist, who has come from Yale University to speak to us this evening. A Kentuckian by birth, he graduated from Yale College in 1895. He studied Physiological Chemistry and took his Ph.D. degree under Professor Chittenden. After a year or two in Germany, he was for twenty years professor of Physiology

in the Yale Medical School and has since then held a Research Professorship under the Graduate School. During the Spanish War he was an Ensign in the United States Navy and saw extensive service in Cuban waters. During the Great War he was chairman of the Medical Research Division of the Chemical Warfare Service and chairman also of the Medical Research Board of the Aviation Service, U. S. Army. The methods which he introduced for testing the altitude to which aviators can fly are still in regular use in the Army Air Service. His scientific work has included determining the pumping action of the heart using a plethysmographic method which he invented, he also described the period of diastasis during the heart beat. This work led to studies upon acapnia and shock, which in turn led to investigations into the cause and prevention of failure of respiration and anesthesia. He was largely instrumental in introducing the practice of rebreathing in anesthesia which helped to make nitrous oxide generally usable by reducing the expense. With the co-öperation of a number of men, among others Dr. Paul D. White, who tried out the method at the Massachusetts General Hospital, he introduced the use of carbon dioxide inhalation as a means of hastening the initiation and termination of anesthesia. In collaboration with Dr. H. W. Haggard he developed the method of treating carbon monoxide asphyxia by means of oxygen and carbon dioxide, a treatment which has come into extended use and saves many lives in every large city every year. Recently he has introduced the use of oxygen and carbon dioxide for the purpose of resuscitation of the asphyxiated newborn. He was a pioneer in the field of respiratory physiology in this country. His conceptions and work have led to practical applications in the broad field of medicine as well as to make him known internationally as a physiologist. It is my privilege, gentlemen, to introduce to you Dr. Yandell Henderson of the Sheffield Scientific School of Yale University, who will address us on: "Resuscitation from Asphyxia in the New-Born and Others."

RESUSCITATION FROM ASPHYXIA IN THE NEW-BORN AND OTHERS

Its Control and Treatment

BY YANDELL HENDERSON, PH.D.*

THE subject of resuscitation has been studied by several commissions specially appointed for that purpose in this country in the last 15 years. The results reached as applied to asphyxiated adults are as follows: Artificial respiration by the Schäfer manual prone pressure method is recommended as against all apparatus of the type of the pulmotor. For electric shock, drowning and similar forms of acute asphyxia it is of primary importance that artificial respiration should be instituted immediately. The delay involved in sending for apparatus is generally fatal. Furthermore, the prone pressure method is probably a more effective means of moving air into and out of the lungs than is the positive pressure produced by apparatus, with its liability to inflation of the stomach and injury to the lungs. On these grounds the Red Cross, Boy Scouts, National Electric Light Association, and various departments of the U. S. Government have all adopted the prone pressure method. It is widely taught and is saving a large number of lives each year.†

Apart from such forms of acute asphyxia there is the much larger problem of gradual asphyxia. Practically all deaths are finally due to asphyxia; respiration fails, the supply of oxygen to the blood, and thus to the tissues, ceases; and the living process comes to an end. The final failure of respiration in infectious and chronic diseases may be delayed, but as yet no physiological therapy (other than oxygen inhalation in pneumonia) is available which is of much more than temporary effectiveness. Fortunately, between acute asphyxia, to which artificial respiration is applicable, and the terminal asphyxia of disease, to which no treatment as yet known is applicable, there are a number of conditions for which the application of the modern physiological knowledge of respiration has supplied a simple and effective treatment. This treatment is inhalation of oxygen containing carbon dioxide as a stimulant to breathing.

The first application of this therapy was in the field of anesthesia. The advantage of conserving the body's store of carbon dioxide by rebreathing under nitrous oxide-oxygen anesthesia was first demonstrated on theoretical grounds and then proved true in practice. And this initial step has led on to far-reaching developments in anesthesia, so that now virtually all the first-class anesthetists in America have carbon dioxide available for every surgical operation. It is used to produce deep, full breathing before the anesthetic is first administered, to control and adjust respiration during anesthesia, and to hasten the elimination of the anesthetic afterward. One of the advantages gained is that morphin may be used freely to quiet the patient, and yet the depression of respiration by morphin so annoying to the anesthetist may be

*For record and address of author see "This Week's Issue," page 1006.

†Drinker, J. A. M. A., Apr. 21, 1928, xc, p. 1263.

counteracted. In this connection also should be mentioned the observations of J. C. White, at the Massachusetts General Hospital, that after operations on the brain in which a slow hemorrhage was gradually bringing respiration to a standstill, the administration of carbon dioxide is effective in maintaining breathing and thus in saving the patient.

Turning now to the matter of carbon monoxide asphyxia, we find a parallel development. Some years ago, Haggard and I showed that in severely asphyxiated cases respiration is greatly depressed. If oxygen is administered, the beneficial effects are slight because the gas is not inhaled. When carbon dioxide is added to the oxygen, respiration is stimulated and the increased ventilation of the lungs, aided by the action of the oxygen upon the blood, rapidly expels carbon monoxide. Wide use is now made of the so-called "H-H Inhalator" which we devised for the administration of a mixture of oxygen and 5 per cent. carbon dioxide to the victims of illuminating gas poisoning, and of the accidents in small garages.

Recently, still another application of this therapy has developed. It has been found applicable to the resuscitation of those newborn infants who fail to breathe or in whom respiration gradually diminishes and passes into a standstill a short time after birth.* The causes of such failures of breathing are deserving of study. They appear to be due in many cases to intracranial hemorrhage. For the resuscitation of such cases significance attaches to the demonstration above mentioned that after brain operations on adults inhalation of carbon dioxide may prevent failure of breathing. In some other cases they are due to the drugs which the mother has received to ease her pains. All such drugs—morphin, scopolamin, chloroform, ether—pass by the placental circulation to the child. They tend to prevent or diminish its spontaneous breathing. Stated in physiological terms, they depress the sensitivity of the respiratory center to the stimulus normally afforded by the blood gases. A higher pressure of carbon dioxide is therefore required to induce breathing.

Accordingly, my colleague, Dr. B. C. Sword, anesthetist to Grace Hospital, New Haven, (who is here and will speak on this matter), has an attachment on his anesthesia apparatus so arranged that after delivery, while the mother is anesthetized for repairs, the respiration of the child may be stimulated by an inhalation of oxygen and carbon dioxide. It is noteworthy that in some cases 10 or 15 per cent. or even higher concentrations of carbon dioxide are beneficial, and indeed even necessary.

For the stimulation of respiration in infants delivered in private practice the custom has grown up, in some cities, of sending for the rescue squad of the fire or police department in order to administer oxygen and carbon dioxide by means of the H-H Inhalator. The essential thing is to have the inhalation apparatus available, and this may be accomplished in any one of three ways: (1) When an anesthetist attends a delivery, his anesthesia apparatus should be provided with an attachment for treating the infant as well as the mother. (2) If no anesthetist is to be present, the obstetrician may have one of the infant inhalators exhibited here this evening; or there might be one such apparatus kept at the medical society rooms to be sent for when wanted. (3) The most effective arrangement of all is for the Medical Society to see to it that the city fire or police department and the hospital ambulances are equipped with the H-H Inhalator. Then the apparatus may be sent for whenever any form of asphyxia, either in adults or infants, occurs in the city.

The question has been raised as to the possibility of reviving infants who are definitely stillborn. I believe that in some cases this should be possible. It depends upon how long after cardiac standstill the resuscitation is attempted. The heart of an infant can be made to beat by perfusing it with a proper fluid many hours, or even a day, after it has been taken from the body of a stillborn child at autopsy, as was shown by Kubliabko about 20 years ago. The respiratory and other nervous centers probably retain the possibility of restoration of life for a much shorter time than does the heart. For an adult ten minutes of complete asphyxia may be destructive to the higher centers; but owing to the less complete development of these centers in an infant, it would not be surprising if a period several times as long could be withstood. In the absence of precise knowledge and experience on this matter as yet, it is at least well worth while for the obstetrician to try to restore the stillborn child. The heart may be still beating, although so faintly that it cannot be heard, and in this case it should be recoverable by supplying oxygen to support combustion and carbon dioxide to stimulate the depressed respiratory center.

Finally, I should like to invite the co-öperation of the clinicians, upon whom the final working out of this whole matter must depend, to determine what is the best concentration of carbon dioxide to be used. In order to play safe, and for other practical reasons, when we introduced the inhalational treatment for asphyxia, we adopted 5 per cent. of carbon dioxide. The experience of anesthetists has demonstrated that much higher concentrations are entirely safe. For the treatment of asphyxia higher concentrations would certainly be more effective than is the relatively mild stimulus of 5 per cent. carbon dioxide. I am inclined to believe that it would be well to increase the con-

*Henderson, J. A. M. A., Feb. 25, 1928, xc, p. 583.

centration of carbon dioxide from the 5 per cent. now generally employed up to 7.5 per cent. or even a higher concentration. I request your co-öperation in determining this point, for the greater the depression of the respiratory center, the higher the concentration of carbon dioxide necessary to produce stimulation, and restore natural breathing.

REMARKS ON CAUSES OF ASPHYXIA OF THE NEW-BORN AND ON RESUSCITATION

BY BRIAN C. SWORD, M.D.*

ASPHYXIA of the new-born is probably due to many different causes, such as delays in progress of descent, intracranial hemorrhage, fetal atelectasis, and other conditions of which we have as yet almost no knowledge. It affords a wide and important field for investigation.

One cause of asphyxia in the new-born must be definitely attributed to antenatal medication of the mother. If she has been treated with morphin, apomorphin, hyoscin, colonic oil ether, or one of the inhalational anesthetics to lessen or counteract her pains, the result is to produce narcosis also in the new-born. The natural tendency of the child to begin breathing is thus decreased or abolished; and in extreme cases the life of the child can be saved only by inhalational treatment to counteract the effects of the drugs absorbed through the placental circulation.

As an illustration let me recite a case, some few months ago, in which I worked for fully two hours in an attempt to bring back an infant that clearly was asphyxiated in this manner. During the period of resuscitation the heart maintained its regularity and force, there was no cyanosis, and the child seemed in excellent condition, except that it would not breathe. During this time the lungs were inflated three or four times a minute with oxygen; otherwise the heart would have been stopped by asphyxia and the child would have died. At last, about an hour and a half after beginning the resuscitation, the child took its first breath, and for the next half hour the rate of respiration gradually increased until it was breathing normally. The resuscitation was brought about by inflating the lungs with 10 per cent. carbon dioxide and 90 per cent. oxygen mixture until natural breathing started, and then by administering this gas mixture for inhalation. Shortly after respiration had been established, it was observed that the infant was exhaling ether. The pupils at this time were pinpoints. Not only had the mother been deeply anesthetized, but the child was so deeply affected by the anesthetic and by the morphin which it had absorbed before birth that spontaneous breathing was prevented. Morphin should never be administered to the mother within an hour before delivery. Even if the last administration of morphin has occurred two or three hours before the delivery, it may prevent spontaneous breathing in the child. Fortunately, in the use of carbon dioxide with oxygen we have a means by which such effects upon the infant's respiration may be counteracted, providing the anesthetist has the time and patience.

In addition to the use of morphin, two procedures are now quite widely applied to counteract the suffering of the mother, namely colonic oil ether, the so-called Gwathmey procedure, and analgesia with two liters of No. 20 nitrous oxide and one liter of oxygen.

As regards the Gwathmey procedure, the above case exemplifies the possibility that colonic oil ether administered to the mother during the first stage of labor may cause asphyxia in the child. If the child does not breathe spontaneously and respiration does not start within ten minutes after delivery, the heart gradually slows down and stops beating. By means of artificial inflation of the lungs with oxygen the heart may be supported so that it continues to beat indefinitely. But respiration may not start until much of the ether has been ventilated out of the body, or a more than normal strength of stimulus has been applied to the respiratory center by the administration of carbon dioxide. In general, the use of colonic ether is not justifiable unless the anesthetist is prepared to support the respiration of the child by the inhalation method for a sufficiently long period (which may extend to hours) to attain spontaneous breathing. Certainly whenever colonic oil ether is employed, the fetal heart should be carefully watched, and if its rate drops below 100, delivery should be effected immediately. The risk to the child from ether administered to the mother through the lungs is much less than from colonic ether, since the anesthesia is controllable.

In New Haven, at Grace Hospital, I have had excellent results with analgesia by means of a gas mixture of two liters of nitrous oxide and one liter of oxygen. During the administration of this mixture the patient remains conscious and is able to co-öperate. Uterine contractions are not delayed, nor is the period of contraction shortened, and the analgesia apparently has no ill effect on the child. This procedure is accomplished by means of a closed circuit outfit in which the exhaled breath passes through soda lime (sodium hydroxide and calcium oxide, half and half) so that the carbon dioxide and moisture are absorbed, thus allowing the mother to rebreathe the gas. This analgesia is continuous, not intermittent, and for that reason the

*For record and address of author see "This Week's Issue," page 1006.

mother's confidence is soon established and the progress of labor is conducted with less excitement.

Finally, I would strongly recommend that every anesthesia apparatus used in labor cases should have an attachment by which the resuscitation of the child may be started while the anesthesia to the mother is still in progress.

Dr. Bock was presented as follows: "We are indeed fortunate to have with us Dr. Arlie V. Bock of the Massachusetts General Hospital, who will open the discussion on Dr. Henderson's paper. Dr. Bock was a member of the Harvard Expedition to the Andes, soon after the war, with a group of physiologists who studied the effect of altitude on respiratory change. He came back to the Massachusetts General Hospital and became the tutor to special students of the Harvard Medical School under the tutorial system. Since then he has continued the study of blood gasses in normal subjects under varying conditions of exercise, and on patients with different degrees of acidosis due to various causes, and also in anemia of different degrees. In the *Journal of Clinical Investigation* and the *Journal of Biological Chemistry*, in association with Professor Lawrence J. Henderson, he has published oxygen and carbon dioxide dissociation curves for normal blood and, largely from these, has produced Henderson's well known "Nomogram" describing changes in the blood incident to respiration. He worked out a method for estimating rate of blood flow (from the respiratory exchange) and found that the blood flow was less in the upright posture. This method has further been applied to Clarence DeMar (Marathon runner) and to poorly trained subjects, with the interesting results that distinguished the athlete from the non-athletic. (DeMar's heart puts out more blood per beat; becomes rapidly slow soon after stopping exercise, shows little rise in blood pressure under fairly severe work, and no evidence of acidosis after a ten-mile run.) These methods are now being applied at the Harvard Business School in the study of industrial fatigue. Bock's dissociation curves of uremic coma indicate that acidosis plays a large part in the resulting death, the hemoglobin becoming inactive under such circumstances. He has also been interested in leukemic and similar types of blood diseases allied to Hodgkin's disease and has followed the effect of splenectomy on a number of atypical anemias in related syndromes. It gives me great pleasure to present Dr. Bock of the Massachusetts General Hospital."

Discussion

A. V. Bock, M.D.: Dr. Henderson has given us a summary of the physiological principles upon which all resuscitation methods depend. To him more than to any one else in this country we are all indebted for clear exposition of these principles and for the present wide-spread use of rebreathing both in the field of anaesthesia and for the treatment particularly of carbon monoxide poisoning.

I agree with him that for immediate purposes no apparatus thus far devised can take the place of the Schäfer method of resuscitation. Apparatus for this purpose is seldom at hand for emergency work and if such apparatus is to be useful at later stages, it must be easily transported. The apparatus of Eisenmenger demonstrated here tonight may find a place in hospital equipment. The principle of positive and negative pressure on the chest and abdomen is sound, but the claims made for it with reference to aiding the return flow of blood apply equally as well to the Haggard-Henderson Inhalator.

At the Massachusetts General Hospital we have tested out the efficiency of the Haggard-Henderson Inhalator in cases of carbon monoxide poisoning. We know that stimulation of the respiratory center by breathing 5% of CO_2 and 95% of oxygen is effective and will increase ventilation to 20 to 30 liters per minute. The result of such ventilation is to pump out of the blood practically all of the CO in a period of about 20 minutes. This inhalational process is closely allied to the mechanism normally controlling our breathing and for this reason is a highly desirable method of stimulating and keeping in action a respiratory center temporarily out of action. The rebreathing method has the advantage also that it can be continued for hours if necessary.

I was greatly interested to hear of Dr. Seward's resuscitation work on new-born infants with the Haggard-Henderson Inhalator. The success of his efforts is encouraging and justifies the advent into every hospital nursery of the necessary equipment for doing this work. Breathing in certain infants cannot be restored permanently owing to cerebral or medullary damage, but others should survive if efficient resuscitation measures could be instituted for a prolonged period. I have seen cases, the past year, in the emergency of suspended breathing, whose breathing could be readily restored by artificial means and who might have survived had we had available a Haggard-Henderson Inhalator.

Charles D. Knowlton, M.D., commented as follows: The subject of rebreathing is an interesting one. It is made use of in shortening the period of muscular cramps. These cramps, and the subject of this evening's meeting are, of course, not exactly the same. I venture to say, however, that one who has a real double adductor thigh cramp is, for a few minutes at least, quite ready to grant that resuscitation measures, or any other that will relieve quickly, are imperative.

I have supposed that such cramps result from

muscle tissue anaemia, the anaemia being the aftermath of overfilling of muscle tissue with blood, following more or less unusual or prolonged use of the muscles. The mechanism of shortening the duration of these cramps by rebreathing is something I wish Dr. Henderson would tell us about.

WILLIAM J. BRICKLEY, M.D.: *Mr. Chairman and Gentlemen*—I did not know that I was to be called upon this evening for any remarks and therefore find myself unprepared.

I was interested to hear Dr. Henderson say that Professor Haldane of London was interested in and familiar with the statistics in and around Boston relating to deaths from various gases, including illuminating gas. As I am one of the Medical Examiners who pass on these deaths and who make the statistics, it gives me peculiar interest to know that these statistics are well known outside of our own district. I suppose that one of the principal causes making toward value in statistics is continuity of observation by the same men under varying conditions, and in this county we are fortunate in having competent men who have served for many years in the same capacity; hence their observations have been standardized over a period of years and the personal equation being unvarying, the other factors would tend to show the true state in the community in regard to deaths. I can assure you that it is the intention of the Medical Examiners of the district to go thoroughly into each case of gas poisoning and to be particular to discover and set down the exact character and manner of the death from gas or vapors.

In regard to the Sylvester method of artificial respiration as compared with the Schäfer method, while I recognize that the Schäfer method is easier to carry on and can be carried on by one operator, and has good points in that the tongue remains forward and the pharynx tends to clear itself, I, personally, am in favor of the Sylvester method when properly carried out. Many of the collapses which I had to handle in a considerable experience of ten years in a busy hospital have been handled on the operating table or in the operating room. Many of them occurred during operations and manipulations. In such cases the quickest, best way is rhythmic compression of the lower chest while the arms are held above the head by an assistant and the tongue held out if necessary.

During collapse, while under ether, it would not be feasible to turn a patient partly operated over on his face. There would be great danger of intestines protruding, of hemorrhage starting, or of internal hemorrhage. It could not be done with safety even if you stuffed a handful of gauze or a sterile towel into an operated wound; the risk would be too great. Therefore the Sylvester method is the only safe method under these conditions.

Further, with the Sylvester method carried out by moving the arms up and down and by compression of the chest and a few quick compressions, the right heart, if dilated, is relieved and the heart takes up its functions again.

I have had occasion to do many autopsies on those who died from shock or who died suddenly from unknown causes, and I have noticed that the right heart is engorged, practically always associated with acute oedema and engorgement of the lungs. If these patients live for any time (and I mean for minutes) the oedema is quite likely to be marked. As the distensible part of the heart is the right ventricle, which is thin walled as compared with the left ventricle, which is thick walled, compression of the chest which would include some degree of compression of the heart, would tend to express the blood out of the right ventricle and tend to permit the right ventricle to contract more or less fully and to resume its functions. With the Schäfer method compression of the heart to any worthwhile degree is not brought about.

I realize that each method is good when employed under the right circumstances, but the quickest, best method while operating is the compression of the chest.

I have had very little trouble in starting a heart which has been still for minutes to half an hour and I have made a heart run for some beats which had been stilled for one hour. The method is simple. It cannot be done always, but under those conditions in which no great destruction has been done to the rest of the body, the heart can be made to function long after it has ceased to beat. I have seen a man whose respirations and heart stopped while we were operating on him for a condition of his hand and wrist and who took no breath for thirty minutes and whose heart had stopped several times, recover from the operation and from his injury, get well and walk out of the hospital. I have seen a man take no breath for three and a half hours and yet by artificial respiration in the form of rhythmic compression of his chest, his heart action was carried on and he had a good pulse, in radials and even dorsalis pedis. That man died, however, and at autopsy was found to have a massive central cerebral hemorrhage. When he first came into the hospital he was thought to be poisoned by acentanelid, of which he had taken a very large dose for a long-standing renal disease.

When I was Resident Surgeon at the Haymarket Square Relief Station, because our hospital handled so many emergency cases (about 40,000 a year), the makers of all sorts of resuscitation apparatus approached us and wanted to put in the apparatus for the purpose of testing them out. Some of these we did test. I remember the first pulmotors. They served a purpose, but they were risky in use. We found that the air being forced into the pharynx went, not

alone to the lungs, but also into the stomach and distended it, and that the air in the lungs could be forced out, but the air in the stomach remained there and, as it ballooned up, pressed against the diaphragm and the heart so that the heart did not have free action.

To overcome this difficulty, at a later time a pad was devised which was strapped across the abdomen and tended to hold the stomach, but while the stomach no longer ballooned up under that system, when the air was forced in through the pharynx, the air went into the stomach as much as it could and then exerted pressure just the same, though the stomach was not distended as much as it had been. We found the air even went through the pylorus into the intestines. This was especially true where the patient was completely collapsed. I took part in some experiments in which the tissues between and over the ribs were cut away on a fresh cadaver, and the pulmotor and other forms of apparatus were used to inflate the lungs and the conditions were studied visually. We found that, unless considerable care and skill was used, the lungs could be so inflated as to cause ruptures of the lungs from which the blood could go into the bronchi. So that my experience of the pulmotor of other years was not especially happy.

There was one form of air pump in which a definite volume of air was sent in and a definite volume of air discharged, the so-called Habberly pump, which was efficacious and would not rupture the lungs provided it was set at the proper capacity, and there was a gauge on it which indicated the capacity for various ages.

While I have seen the recent apparatus used and at autopsy have seen the effect of the use of recent apparatus for artificial respiration, I am not entirely familiar with it. It is very interesting to me to learn that an admixture of CO_2 is so highly desirable. I have often given oxygen into the rectum and under the skin and into the pharynx through a nasal tube, and I remember one case of morphin poisoning that got as low as three breaths a minute, who with artificial respiration with oxygen lived, but I have had no experience with this recent apparatus on the living.

In regard to the injection of adrenalin into the heart muscle for the purpose of producing heart action when it has stopped, I do not think highly of it. I see many cases at autopsy in which this has been done and in which it has failed to continue life. I suppose it is one of those things which the doctor feels he must do—to reasonably exhaust all methods that might prolong life even though he feels that the method employed is only a forlorn chance. I feel, however, that, in a heart which is functioning, the injection of adrenalin may very well bring about an embarrassment which would be harmful.

In regard to the Dr. Rudolf Eisenmenger apparatus which was before us tonight for demonstration, I realize that it is easy to criticize; and difficult to be constructive, but I note that the respiration is carried on here by alternate compression and relaxation of the abdomen, which, operating through the diaphragm, produces inhalation and exhalation. It seems to me that, if the patient had material in the stomach, especially if the patient had a full meal, the compression of the abdomen would tend to force the contents of the stomach up into the esophagus and pharynx, where it would be sure to meet the air column going into the pharynx on its way to the trachea, and that the next inhalation would tend to carry the stomach contents into the trachea. It seems to me that this would be especially true if the sphincters were relaxed. I note the alternate forcible compression and relaxation would virtually amount to a massage of the stomach and the stomach would be quite likely to empty its contents.

In regard to what may be one of the reasons for failure to obtain respiration in a newborn child in which there is some indication of heart action. I have had occasion to do some autopsies on newborn, where I have noted, when I opened the head, that an odor of ether could be detected from the brain, even though the child never had breathed and had not received ether in any manner. The only means by which the child could have received ether was through the mother who had received ether by inhalation. I noted the ether odor stronger on the brain than I did when I opened the abdominal cavity; and if the odor was there, clearly the ether was there in greater quantities than it was elsewhere. This, perhaps, may indicate one of the reasons why newly born children of mothers who have received ether have difficulty in having respiration started.

On motion of Dr. Donoghue a vote of thanks to Dr. Mason was passed for a most profitable, stimulating and delightful evening.

IMPETIGO NEONATORUM

Its Control and Treatment

BY ORVILLE R. CHADWELL, M.D.*

IMPETIGO NEONATORUM is a communicable skin infection of the new-born most frequently seen in lying-in institutions. Many text-book authorities such as MacLeod[1], Stelwagon and Gaskill[2], Ormsby[3], Morse[4] and Sutton[5] classify it as synonymous with *impetigo contagiosa* and *pemphigus neonatorum*. Highman[6] simply mentions a bullous type of impetigo contagiosa. Hazen[7] looks upon impetigo bullosa as one variety of impetigo contagiosa and recognizes that there is a growing tendency to regard pemphigus neonatorum as another form of impetigo contagiosa. Holt and Howland[8] put pemphigus neonatorum and impetigo bullosa in the same class, placing impetigo contagiosa in a class by itself. Sheffield[9] considers pemphigus neonatorum as being in the same class with impetigo contagiosa, making no mention of impetigo neonatorum; while Chapin and Royster[10] regard impetigo neonatorum as being the same disease as impetigo contagiosa, making no mention of pemphigus neonatorum. Lucas[11] states that pemphigus neonatorum is a severe form of impetigo neonatorum, but believes that impetigo contagiosa is an entirely different skin infection.

Both text-book authors and research workers differ among themselves as to the etiology of impetigo neonatorum, though all were well agreed as to its most common mode of transmission. Among the text-book writers, Highman[6], MacLeod[1], and Lucas[11] believe that the streptococcus is the only cause of this infection, while Hazen[7], Ormsby[3], and Sheffield[9] believe that the staphylococcus is the sole etiologic agent. Holt and Howland[8] believe that staphylococcus aureus is the most common cause, but that a streptococcus sometimes is a cause. This belief is shared by Chapin and Royster[10]. Morse[4] states that the disease is usually caused by the staphylococcus aureus, but that it may be caused by the staphylococcus albus or a streptococcus.

Among the research workers, McCandlish[12] has found that his cultures taken from the blebs show that staphylococcus pyogenes aureus was the causative agent. Matzenauer[13] in 1900 linked pemphigus neonatorum and impetigo contagiosa together and showed that the staphylococcus pyogenes aureus was the causative agent in both. Knowles and Munson[14] have found that the cause of impetigo neonatorum seems to be the staphylococcus pyogenes aureus. Belding[15] has found the causative agent to be a staphylococcus aureus of special virulence, with cultural characteristics practically the same as those of the ordinary staphylococcus aureus. Blaisdell[16], Morrow[17], and Cole and Ruh[18] have found that the bullous type of impetigo seen in infants is caused by the staphylococcus pyogenes aureus and that the crusted variety seen in older children is caused by a streptococcus. Mellon, Caldwell, and Winans[19] have come to the conclusion that the staphylococcus pyogenes aureus is the most common cause, while the staphylococcus pyogenes albus is less commonly a cause of impetigo neonatorum. Dickey[20] and Balmain[21] have each come to a similar conclusion. Dickey, however, found the streptococcus fecalis to be the cause of an unusually virulent case with toxic symptoms, while Balmain has found diphtheroid organisms three times, once in pure culture, in working with his cases. Smith and Burkey[22], in experimenting with the crusted impetigo seen in older children, have found that where cultures of staphylococcus are obtained, the disease is much more resistant to treatment than where a streptococcus is found in the lesions.

The writer believes that the invading organism is generally one of the staphylococcic group, whether we have impetigo neonatorum, impetigo contagiosa, or pemphigus neonatorum, and that the age of the child and the virulence of the particular strain are responsible for the variations in the appearance and course of the disease. In the new-born baby the crustaceous character of impetigo, as seen in the run-about child, is generally absent, and only rarely is the disease virulent enough to dignify it with the erroneous term *pemphigus*.

The writer has been seeing annually, over a period of several years, between 1500 and 2000 new-born, and his observations are at some variance with certain text-book descriptions of this malady.

While the disease is commonly *sporadic*, if it becomes epidemic in a large institution it is more likely to do so in the hot, humid months when nurseries are commonly overheated. Then the most frequent site of the lesions is in the axillae and groins, due possibly to maceration of the skin from sweating and ensuing easier inoculation. (MacLeod[1] mentions in his text-book that bullous impetigo is prevalent both in adults and children in the tropics, where it is most common in hot, damp weather. The lesions are not infrequently localized about the posterior wall of the axilla.)

The typical lesion is likely to be first observed

*For record and address of author see "This Week's Issue," page 1006.

as a bulla or bleb, in the beginning showing a clear serous content. Later a white or yellow purulent content appears, varying according to the type of staphylococcus. There is a slight areola of redness, and in the majority of cases the lesion appears to be discrete, and entirely without systemic signs.

In *sporadic* cases it is not infrequent that one sees infected areas on the face and head, generally due to trauma from the infant's nails, with subsequent infection, and here the lesion presents more of the characteristics of the disease in older children, particularly as regards crusting.

Every so often the condition assumes great virulence, spreading rapidly from one basket to another, and causing a general sepsis or furunculosis. Here the term used has frequently been *pemphigus*, but the writer believes that the use of the latter word is an error. (In true pemphigus, the bullae arise from the skin surface having no red areola around them, and the contents of the bullae are sterile, while here the lesions usually contain staphylococci in culture.)

A state of affairs like this latter situation causes consternation, and has repeatedly, in the neighborhood of Greater Boston, caused a closing of wards and a cessation of admissions until a general "clean-up" is accomplished. This has applied both to the large and well-managed hospitals and to those smaller and not so well conducted.

Incidentally, impetigo neonatorum is a *reportable* disease in most localities. It is safe to say, however, for obvious reasons, that most of the cases are not reported.

But regardless of classification or pathology, we have lately begun to feel at the Robinson Memorial Hospital, that there need be no great occasion for dread of this scourge of the newborn in a lying-in hospital. We expect on rare occasions to see *pyodermia* in some infant. We do *not* expect to witness its spread or to close our wards. This may all be premature satisfaction, but the fact remains that for nearly three years, during which time some 5000 infants have been observed, we have remained unscathed, though other similar institutions have been seriously involved. The writer attributes our freedom from the ravages of this disease to the maintenance of the routine described as follows.

Prophylaxis. As soon as the delivery room care of the eyes is carried out and the routine dose of adult blood is administered, the infant is sent to the floor nursery. Here it receives its *only washing* with soap and water during its sojourn in the institution. Following the removal of vernix and blood by this washing, the baby is "larded" with unguentum hydrargyri ammoniati 5% from crown to sole. The orders are to rub *in*, not *on*. All *subsequent* care of the skin consists of a *daily* thorough inunction with sterile cottonseed oil. In theory, this practice aids still further toward impregnating the skin pores with the mercurial ointment. When diapers are changed, the invariable rule is to wipe off the parts with absorbent cotton and sterile oil, without the use of water. In so large an institution, the advantages of this omission of water bathing are numerous, but such discussion scarcely belongs in this article.

Isolation. The smallest skin lesion is reported immediately to the resident or visiting pediatrician by the nurse, but this report is generally not made until the baby has been routinely put "on precautions." We have a small, so-called isolation room, for each nursery, and of course depend on frocking and the prevention of finger contacts. Every case of *pyodermia*, however simple, is regarded as a *potential* case of impetigo, and is subjected to the following routine, private case or house patient.

Treatment. Any or each suspicious lesion is evacuated and the area thoroughly anointed with 5% ammoniated mercury ointment twice daily. Practically speaking, this is the end of the episode. If no new lesions appear in three days, the infant is returned to the nursery. Should there be several lesions on an infant, typical in character, not only is the above technique carried out, but in addition the entire skin surface of the infant is thoroughly rubbed daily with a 3% ammoniated mercury ointment.

Rarely, in hot weather, in the presence of bullous lesions of apparent virulence, this latter mentioned inunction is substituted for the routine sterile oil application for a few days. Such a procedure occurs only, however, when we, so to speak, "lean over backward" and when the obstetrical visitant looks particularly grave and concerned for the cleanness of his service. In our *private* nursery, where every visitant is apprehensive because he knows of some similar institution with closed doors, a concession is frequently made in this direction of safety.

Many workers among whom are Balmain[21], Haldin-Davis[23], Blaisdell[16], and McCandlish[12], prefer other forms of treatment to mercurial preparations in cases of infantile impetigo. We have always found ointment of ammoniated mercury effective, and *we have never seen a mercurial dermatitis or any other sign of poisoning* from the drug. If we should see such a dermatitis, we should simply use a soothing ointment and expect no further trouble. There is, of course, no relaxation in aseptic technique.

The writer fully realizes that there is nothing original in this contribution; only the application of old principles. It is offered for what it is worth. The following out of this technique has apparently resulted in practical freedom from impetigo neonatorum in one of the largest lying-in hospitals in New England. There is little expense involved; in fact none save for the mercurial ointment.

In conclusion, the writer wishes to express

his gratitude to the entire Obstetrical Service and to Dr. Wesley T. Lee and his associates for their co-öperation and advice.

Summary.

A routine technique to prevent, or cure, impetigo neonatorum in a large institution is described.

The method used depends more on antisepsis than asepsis, though thoroughness in the latter should be and is insisted upon.

No *contra-indications* for this routine have been observed.

For three years, in the face of the usual difficulties, this disease, in epidemic form, has been unknown in one of the largest lying-in hospitals of New England.

BIBLIOGRAPHY

1 MacLeod: Diseases of the Skin. Paul B. Hoeber, New York, 1921.
2 Stelwagon and Gaskill: A Treatise on Diseases of the Skin. W. B. Saunders Co., Philadelphia and London, 1921.
3 Ormsby: A Treatise on Diseases of the Skin. Lea and Febiger, Philadelphia and New York, 1921.
4 Morse: Clinical Pediatrics. W. B. Saunders Co., Philadelphia and London, 1926.
5 Sutton: Diseases of the Skin. C. V. Mosby Co., St. Louis, 1923.
6 Highman: Dermatology. Macmillan Co., New York, 1921.
7 Hazen: Diseases of the Skin. C. V. Mosby Co., St. Louis, 1923.
8 Holt and Howland: Diseases of Infancy and Childhood. D. Appleton & Co., New York and London, 1922.
9 Sheffield: Diseases of Children. C. V. Mosby Co., St. Louis, 1921.
10 Chapin and Royster: Diseases of Infants and Children. William Wood & Co., New York, 1925.
11 Lucas: Modern Practice of Pediatrics. Macmillan Co., New York, 1927.
12 McCandlish, H. S.: Report of 224 Cases of Impetigo in the Newborn. Am. J. Obs. and Gyn., 1925, 9:228.
13 Quoted by McCandlish. See 12.
14 Knowles, F. C., and Munson, H. G.: Institutional Epidemics of Bullous Impetigo Contagiosa in Infants. Arch. Dermat. and Syph., 1923, 7:376.
15 Belding, D. L.: Notes on the Etiology and Epidemiology of Impetigo Contagiosa Neonatorum. Am. J. Obs. and Gyn., 1926, 11:No. 1.
16 Blaisdell, J. H.: Management of Impetigo Contagiosa in Maternity Hospitals. J. Am. M. Asso., 1924, 83:833.
17 Morrow, H.: Treatment of Impetigo Contagiosa. J. Am. M. Asso., 1917, 69:177.
18 Cole, H. N., and Ruh, H. O.: Pemphigoid of the New-born (Pemphigus Neonatorum). J. Am. M. Asso., 1914, 63:1159.
19 Mellon, R. R., Caldwell, D., and Winans, W. W.: The Mother's Milk as a Source of Infection in Epidemic Pemphigus Neonatorum. Am. J. M. Sci., 1925, 169:419.
20 Dickey, L. B.: A Study of an Epidemic of Impetigo in New-Born Infants. Arch. Pediat., 1926, 43:145.
21 Balmain, A. R.: An Investigation into the Aetiology of Impetigo Contagiosa with Notes on Treatment. Lancet, 1926, 2:484.
22 Smith, D. T., and Burky, E. L.: Impetigo Contagiosa in Children—Its Etiology and Treatment. Bull. Johns Hopkins Hosp., 1924, 35:78.
23 Haldin-Davis, H.: The Treatment of Impetigo Contagiosa. Lancet, 1925, 2:1296.
24 Ellison, J. B.: The Treatment of Impetigo Contagiosa by Means of Ultra-Violet Rays. Lancet, 1927, 1:1343.

CANCER OF THE TONGUE AND FLOOR OF THE MOUTH; DEMONSTRATION OF A CASE*

BY FREDERICK W. O'BRIEN, M.D.†

THE case which I am presenting shows an excellent result of treatment of cancer of the tongue and floor of the mouth by combined radium, electro-surgery and X-ray therapy, the accepted methods today in the treatment of malignancy. Besides being a very satisfactory end result, as cases of this type go, this particular patient is instructive in other ways.

The patient, W. J. K., was 54 years of age, when, in December, 1926, he first noticed a pea-sized growth on the right margin and inferior surface of the tongue, which was not painful at first, and did not bleed. Very shortly after, two similar pea-sized growths appeared on the gum margin, as he described it, which were painful. In February, 1927, without X-ray examination, a dentist extracted several teeth for relief of pain. The following month (March, 1927), the patient presented himself at the Huntington Hospital (where a diagnosis was made of carcinoma of the floor of the mouth, squamous cell in type, and where, at three different sittings a month apart, gold radium seeds were implanted.

In June he came into the Boston City Hospital, his chief complaint then being pain, secondary to his radiation glossitis. Because of his inability to move his tongue, he was unable to swallow food easily, and had to assist it down with his fingers. He was salivating freely, and had a fetid breath. The submaxillary glands on the right side were enlarged. The surgical note says "diffuse ulceration of floor of the mouth, extending to margin and inferior surface of the tongue, which was electrocoagulated."

*Read before the Staff Clinical Meeting, Boston City Hospital, April 14, 1928.

†For record and address of author see "This Week's Issue," page 1006.

On June 15th, I saw him for the first time, when he was referred for external radiation. High voltage therapy with copper filtration was prescribed to both right and left cervical regions. He continued to complain of pain, now localized in the remaining lower teeth, and was referred to the dental department for mouth hygiene and care. By September, the glands of the right side of the neck had decreased in size, the mouth was fairly clean, and it was thought justifiable to remove the painful teeth. This was done and the patient was much more comfortable, partly because the removal of the teeth gave more room to his tongue, which continued to be swollen.

By the following month (October, 1927,) he appeared to give every indication of extension of his disease. The buccal muscles were indurated, the mandible itself enlarged and the neck tissues on the right tense and brawny. It seemed at this time as though he had had all the external radiation that could be given without increasing his difficulties, and he was discharged unrelieved to the Holy Ghost Hospital.

In December he came to the clinic and presented me with this sequestrum (Fig. 1) which I shall pass among you. It represents most of the body of the lower jaw. When I saw him at this time, the gums were healed with the exception of one area, where a small sequestrum presented itself. This was removed and since that time the patient has been perfectly free from symptoms. His tongue had resumed its normal size, and he was able to talk and eat as before.

At this time, owing to a follow-up letter, he reported at the Huntington Hospital and their note states they were unable to find anything that would denote the presence of his original lesion. One week ago (April 2nd) he came to the radiation clinic

with a gland for the first time on the left side of the neck.

COMMENT

A review of this case is illuminating. First and foremost, because in centering attention on his cancer, we did not exercise common surgical judgment. While he appeared badly off from his malignant disease, in reality a chronic osteomyelitis, which was not recognized, was giving the most difficulty.

No X-ray examination was made prior to the first extraction of the teeth, which may have been abscessed. Teeth were extracted later

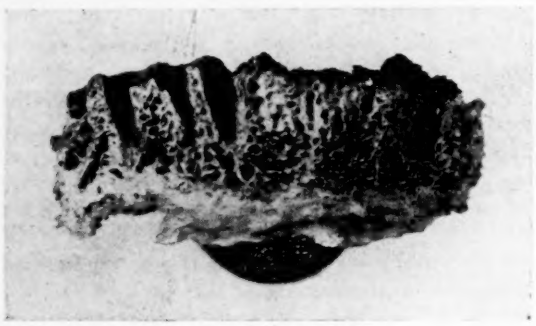

FIGURE 1.

when there was slough present following electrocoagulation. Further, it is common knowledge that the employment of heavy radiation, whether radium or X-ray, close to bone, is not good practice, because necrosis is often a sequence. With these clear leads, we were still blind to the man's osteomyelitis.

Again this case brings up the matter of oral hygiene. Too often I find that the surgeon loses interest in the chronic case following the immediate operative procedure. Infection and slough will follow straight surgery or electrosurgery, in these mouth cases, because of the presence of poorly nourished, damaged tissue; hence, these mouths should be kept clean daily, by suction, swabbing with peroxide, mercurochrome and Dakin's solution, to the greater comfort of the patient, and shortened convalescence. Further, this case illustrates the importance of getting X-rays of the teeth and jaws before beginning the treatment of lesions in their neighborhood, for greater accuracy in diagnosis and follow-up.

The appearance of this gland on the left side, while a discouraging complication, calls to mind the possibility of cross-fire in metastasis, and demonstrates the need of radiation of not only the affected but the unaffected cervical triangles, in all similar cases. In checking the records, I find that while heavy radiation was prescribed on two separate occasions for both sides of this patient's neck, he received, as a matter of fact, five times as much dosage on the right side as on the left. Whether or not, if the dosage had been equalized, it would have prevented this glandular enlargement on the left side, I question. The gland is not fluctuant, and the capsule appears intact, and I am going to begin an intensive course of radiation over it. If it is inflammatory, it will probably rapidly decrease in size. The corollary to this case, as I see it, is to treat the patient rather than the disease.

SCURVY, PELLAGRA, AND SPRUE AT THE BOSTON CITY HOSPITAL*

BY GEORGE C. SHATTUCK, M.D.†

I am glad of this opportunity to say a few words about some of the work which the Service for Tropical Diseases has been doing here at the Boston City Hospital.

SCURVY

The first case of scurvy in an adult which is catalogued in the Hospital records was diagnosed in 1923. Its recognition was soon followed by the discovery of 2 other cases, and, in the year 1926 alone, 9 new cases were recorded. The total number to date is 17 cases. Scurvy in the adult seems, therefore, not to be an extremely rare disease[1], and the possibility of running across a case should be borne in mind.

The essential points for diagnosis are: firstly, evidence of prolonged and pronounced dietary deficiency; secondly, hemorrhages or purpuric spots not otherwise satisfactorily explainable; and thirdly, absence of the blood changes characteristic of thrombopenic purpura. It is well to remember that the anemia and hemorrhages of benzol poisoning may simulate scurvy, and that leukopenia and a history of exposure are valuable for the recognition of benzol poisoning. The blood picture presents the following differences in scurvy, purpura haemorrhagica and haemophilia:

	Scurvy	*Purpura Haemorrhagica*	*Haemophilia*
Platelet Count	Normal	Low	Normal
Retraction of Clot	Retraction	No retraction	Retraction
Bleeding Time	Normal	Prolonged	Normal
Coagulation Time	Normal	Near Normal	Prolonged

PELLAGRA

A survey of pellagra[2] in Massachusetts was made in 1923. It showed that pellagra is widely distributed in the State among the native-born, is by no means rare, and develops most frequently in summer.

*Read at Annual Meeting of Boston City Hospital Alumni, April 14, 1928.

†For record and address of author see "This Week's Issue," page 1006.

Up to 1922 only 7 cases had been diagnosed at the Boston City Hospital against 28 at the Massachusetts General Hospital and the same number at the Danvers Insane Hospital. In the year 1922 alone, 7 more cases were discovered at the Boston City Hospital. The total at this Hospital stands now at 44 individual cases in which a positive diagnosis of pellagra has been made and 11 others in which the diagnosis was made doubtfully. The greatly increased number of cases diagnosed here since 1922 is due, I believe, to more scientific diagnosis and to the recognition of the fact that pellagra is relatively common here in chronic alcoholics[3].

Symptoms of gastro-intestinal irritation, diarrhea and, frequently, the absence of hydrochloric acid from the gastric juice point to marked derangement of the digestive functions in pellagra. The seriousness of this disorder is shown by the fact that patients having severe symptoms of the disease require a bland diet. Their powers of digestion for all kinds of food seem to be greatly impaired. When the digestion responds to treatment, the patient generally recovers. In very chronic cases the recovery of digestive power is likely to be slow. When recuperation of the digestive function is too long delayed, the patient dies in a condition of great physical weakness and emaciation.

Although in recent years much light has been thrown upon the causes of pellagra, and although a good deal can now be done toward prevention and cure, much more should be learned about the gastro-intestinal secretions and about the factors which influence the assimilation of food in this disease.

SPRUE

The third disease to be discussed is sprue. Some of the symptoms are strikingly like those of pellagra. Both diseases tend to develop insidiously, to become chronic, and to recur. In both conditions the gastro-intestinal symptoms occupy the foreground of the picture and weakness and emaciation result. In sprue, as in pellagra, there is a manifest deficiency of digestive power, and the outcome depends upon whether or not this power can be sufficiently restored. Hydrochloric acid may be lacking in the gastric secretion in either disease.

Sprue shows several notable differences from pellagra, however. In sprue the power to digest carbohydrates and fats is notably deficient and there is also a marked tendency toward the development of anemia of a severe type. Anemia is seldom a prominent feature of pellagra. Lesions of the brain and spinal cord are constantly present in advanced cases of pellagra but are seldom seen in sprue.

There should be no difficulty in recognizing fairly typical cases of pellagra or of sprue, but an undeveloped case of either disease might be mistaken for the other. In the present state of knowledge, neither diagnosis can be proved or disproved in a doubtful case except by waiting for the development of more characteristic signs. In pellagra, however, there is probably an abnormal sensitiveness of the skin to sunlight, which might be demonstrable by exposing the patient's face to a degree of solar radiation which would not affect the normal individual.

The points of resemblance between sprue and pernicious anemia include chronic indigestion, sore tongue, nerve degeneration, deficiency of gastric secretions, and anemia. The anemia in sprue may be extreme and the blood picture may be indistinguishable from that of pernicious anemia.

Although cases of sprue may develop in northern latitudes, nearly all of such patients have resided at some time in parts of the tropics or subtropics where sprue is endemic. It is by no means certain, however, that cases of sprue may not originate occasionally in the north-temperate zone, in persons who have never been to the tropics. This possibility adds to the difficulty of distinguishing between sprue and pernicious anemia.

Another important point to bear in mind in making a differential diagnosis is that cases of pancreatic disease with excess of fat in the stools may simulate sprue.

INVESTIGATION UNDERTAKEN

Because of the similarity of certain features of pellagra, sprue and pernicious anemia, an investigation of the two former diseases has been undertaken jointly by Dr. W. B. Castle of the Thorndike Memorial Laboratory and by the Service for Tropical Diseases. Dr. Castle will be assisted in this work after May 1, 1928, by Dr. Wilmot C. Townsend, who has been appointed jointly by the Service for Tropical Diseases and the Thorndike Memorial Laboratory as an Assistant Resident.

Because the study is sure to be handicapped by scarcity of cases of sprue and because new methods of treatment will be tried which may prove beneficial to the patient, I venture to ask for your co-öperation to the extent of putting Dr. Castle or me in touch with cases of sprue should the opportunity arise.

REFERENCES

1 Shattuck, G. C.: "Scurvy with Reference Especially to Adults", Jour. A. M. A., Vol. 90, p. 1861, June 9, 1928.

2 Shattuck, G. C.: "Pellagra in Massachusetts", Boston Med. and Surg. Jour., Vol. 188, p. 110, 1923.

3 Shattuck, G. C.: "Factors apparently influencing the development of pellagra in Massachusetts", Boston Med. and Surg. Jour., Vol. 188, p. 889, 1923.

REGIONAL ANESTHESIA IN OBSTETRICS

With A Report of Twenty-Eight Deliveries Under Epidural Block*

BY WILFRED PICKLES, M.D.,† AND SCOTT S. JONES, M.D.†

FROM time immemorial continued efforts have been made to relieve the parturient woman of some of her pain. Among savage peoples a form of analgesia obtained by intoxication with alcoholic beverages has been used for centuries. The knowledge of other drugs used for this purpose has been handed down to us through ancient history—drugs such as opium, mandragora, hemp, etc. In the middle ages a concoction of opium, hyoscyamus, hemlock, mandragora, ivy, lettuce and dock seeds was in common use, the fumes from this mixture producing anesthesia.

But it was not until after Davy's experiments with nitrous oxide, Long's and Morton's with sulphuric ether, and especially Simpson's with chloroform in the first half of the nineteenth century, that the present era of obstetrical anesthesia began. Simpson's masterly defence of chloroform finally overcame the strong theological opposition to its use in childbirth, and general anesthetics have been used increasingly for this purpose since that time. In spite of this, we still hear expressed the idea that the Almighty intended woman to bring forth her offspring on the bed of pain, and that to attempt to obtain relief for her is sacrilegious.

At the present time many forms of anesthesia are used in obstetrics. These include the inhalation anesthetics such as ether, chloroform, nitrous oxide, and ethylene; drugs given by rectum, as ether in oil, with or without magnesium sulphate; and drugs used by injection, such as morphine, scopolamine, and procaine—the latter being injected intraspinally, in the sacral canal, parasacrally, or locally.

In undertaking this study it was our intention to select some method of obtaining obstetrical anesthesia which would be effectual, safe for both mother and child, and with a technique easy enough of acquirement so that it might be of wide general value. Realizing that the various forms of inhalation anesthesia are highly satisfactory in most cases, we have felt that many patients would be benefited by the use of some local method. We have, accordingly, investigated the various methods of inducing nerve block by means of procaine.

REVIEW OF THE LITERATURE

Cathelin first called attention to the possibilities of sacral nerve block in 1903. He had injected a solution of cocaine into the sacral canal of dogs as early as 1900. When the nontoxic drugs, such as procaine, became known, Stoeckel reintroduced the procedure, using it on 141 normal obstetric patients in 1909. He used 30 c.c. of a 0.5% solution and reported that the severity of the pains was substantially reduced. Tobiaszek, in the same year, reported using 0.5% solution on thirty patients with little effect. In 1910, Schlimpert and Schneider dismissed the method as worse than worthless, yet the next year Schlimpert reported carrying out this procedure in a series of 149 deliveries. Rielander reported its use on 65 patients; he found the uterine pains to be lessened, but he was unable to repair the perineum without pain. Baum reported 50 cases.

Laewen, in 1910, developed the sacral method so that it was practicable for surgical operations, using a solution containing 1.5% to 2% procaine with sodium bicarbonate. Kehrer used as much as 60 c.c. of the 1.5% solution, finding it of use in gynecological operations, but not in obstetrics. Piantoni, in 1913, was the first to remark the rarity of lacerations of the perineum when sacral block was used.

In 1915 Schloessingk employed sacral anesthesia in operative procedures. In 1916 Lewis and Bartels used it in genito-urinary surgery. In 1917 Thompson made an extensive anatomical and experimental study of it. Lynch, in 1918, reported using this form of anesthesia on 80 patients, and Meaker reported a similar series in 1919, suggesting that it might be beneficial in obstetrics. Many others have used it in gynecology and genito-urinary work, establishing it as a safe procedure. Zweifel, in 1920, collected 10 fatalities in 4200 cases, stating that the anesthesia was responsible for death in but three of these.

In 1921 Schellekens reported 8 deliveries, using 20 c.c. of 2% procaine solution with good results. In July, 1923, Oldham reported a series of over 200 deliveries, believing himself the first to attempt caudal anesthesia in childbirth in this country. He has since published several papers on the subject. In the most recent of these, reporting over 500 deliveries, he found it very effective in 85% to 90% of all cases.

In September, 1923, Meeker and Bonar published their excellent article on the value of sacral nerve block in obstetrics. They reported 90 deliveries with very good results in operative cases and painless spontaneous deliveries if the injection is given at the proper time. They concluded that it would become the anesthesia of choice for obstetrics if it could be made to last for five or six hours.

*From the Providence Lying-in Hospital.
Thesis presented to the Faculty of Gynecology-Obstetrics of the Graduate School of Medicine of the University of Pennsylvania, in partial fulfilment of the requirements for the degree of Master of Science in Medicine for graduate work in obstetrics.

†For record and address of author see "This Week's Issue," page 1006.

Rucker, in 1925, reported 103 cases with good results. He preferred caudal anesthesia for operative cases but found its value for spontaneous delivery dubious.

Braun used parasacral anesthesia, blocking the sacral nerves at the points of their emergence from the anterior sacral foramina, and found it more reliable than sacral but more difficult.

In 1913 Danis proposed trans-sacral—a blocking of the sacral nerves through the posterior sacral foramina. Meeker and Frazer reported using this method combined with a low epidural injection on 225 patients at the Mayo Clinic. They claimed absolute anesthesia of the pelvic floor and viscera in practically all cases.

Spinal anesthesia has been employed by some with good results in obstetrics. Babcock in 1913 stated that it gave satisfactory relaxation of the perineal muscles, facilitated operative delivery, and reduced cardiac and pulmonary strain. Huggins stated the indications for its use. Astley reported favorably on its use in Cesarean section for toxemia. Cooke reported its employment in spontaneous deliveries as well as in Cesarean section. Cosgrove reported a series of 54 patients with 10 instances of normal spontaneous delivery with excellent results.

There have been advocated, at various times, other procedures involving the use of procaine to relieve the pain of childbirth. In 1910 Ilmer recommended that the pudic nerve be blocked on each side of the perineum for the second stage of labor. In 1916 King reported utilizing this method with good results, and gave an excellent description of the anatomy and technique. Recently Schmidt reported its use on 100 patients.

Hoag advocated infiltrating the perineum with procaine when delivering under nitrous oxide, in order to secure relaxation of the muscles of the perineum. He used 0.25% procaine solution and thought it a distinct help in procuring relaxation. Gellhorn has used procaine injections of the perineal body and levator muscles for some time, and has claimed that it relaxes the perineum and makes delivery easy and painless.

In 1913 Gellhorn advised injecting procaine into the cervix and broad ligaments to relieve the pain of dilatation. Similar methods have been used by Schneider, Febres and Cotte.

NERVE SUPPLY

The nerve supply of the uterus is complex, involving the central nervous system, the involuntary or sympathetic system, and an intrinsic nerve supply of the organ itself. The sympathetic nervous system is divided functionally into two distinct portions, the cranio-sacral and the thoraco-lumbar outflows. Most of the viscera receive a supply from each of these portions, which are antagonistic in function, and the uterus is no exception to this general rule. The thoraco-lumbar outflow is represented by branches from the inferior mesenteric ganglion, which takes its origin from the lower dorsal and lumbar segments of the cord; while the cranio-sacral outflow reaches the uterus by way of the utero-vaginal division of the pelvic plexus, taking origin chiefly from the second, third and fourth segments. This latter portion is the major part of the innervation of the uterus. The utero-vaginal plexus is divided into two portions, one supplying the posterior and lateral parts of the uterus, the other comprising a chain of ganglia along the cervix and vaginal vault. The largest of these ganglia, the cervical ganglion, is spoken of as the sole sympathetic supply by some authors, and receives, in addition to the sympathetic fibres, spinal fibres from the second, third and fourth sacral nerves. From this ganglion branches are then distributed to the uterine walls, passing between the layers of the broad ligament, being particularly numerous in the neighborhood of the blood vessels. Both portions of the sympathetic innervation are composed solely of efferent fibres and are thus purely motor in function; the only afferent fibres from the uterus are those reaching the cord by the second, third and fourth spinal nerves; consequently these are the only nerves involved in the sensation of pain of uterine origin.

From the foregoing description it might be supposed that contraction of the uterus was a function of one of the divisions of the sympathetic system, but this does not seem to be the case. Several investigators have shown that an intrinsic nerve supply can care for the activities of the uterus, and that the complete severance of all extrinsic nerve supply has no effect on the progress of labor other than that of rendering it completely painless. We may then conclude, with Williams, "that 'the intrinsic nerves are the main factor concerned in the production of uterine contractions'; that 'the central nervous system has principally a regulative function, makes possible the perception of pain, and controls the voluntary abdominal contractions'; and that 'the sympathetic system regulates the vascular conditions' ".

The tissues of the pelvic floor, the other structure chiefly concerned in parturition, derive their nerve supply, both sensory and motor, entirely from the central nervous system through the second, third, fourth and fifth sacral nerves. We thus see that these four nerves contain all the afferent fibres concerned in the perception of pain caused by the uterine contractions and the passage of the foetus along the birth canal to its delivery over the perineum.

METHODS OF NERVE BLOCKING

The problem of obtaining painless labor without the abolition of consciousness, then, resolves itself into bringing about "physiologic section" of these four sacral nerves, and this may be accomplished by any one of several methods. The most direct and in some respects the simplest method is that of blocking the spinal cord itself.

The injection of a small amount of procaine, suitably diluted with spinal fluid, into the subarachnoid space in the region of the third or fourth lumbar vertebra will result in anesthesia of all structures supplied by nerves leaving the cord below this point. This brings about a condition comparable with that existing in patients who have sustained destructive injuries of the lower spinal cord and who have been shown to have normal labor with the exception that pain and expulsive efforts on the part of the abdominal muscles are absent. The simplicity and rapidity with which this block may be brought about have led to a moderately extensive use, but general acceptance of the method has been withheld because of very definite associated disadvantages. The chief one of these is the apparently unavoidable fall in blood pressure, which is always marked, is frequently alarming, and may prove fatal. The drop in pressure may be as much as 60 mm. of mercury and is most marked in young patients, its occurrence being much less frequent in patients over forty-five. The addition of caffeine and strychnine to the anesthetic solution at the time of the injection is not particularly effective in preventing this hypotension, while the subcutaneous administration of pituitrin is of considerable value. This latter procedure, obviously, cannot be used in obstetrical patients. The method is contraindicated in the presence of myocardial weakness, shock, or acute blood loss, and is, accordingly, an anesthetic suitable chiefly for the strong, healthy, middle-aged patient. We have felt, therefore, that this form of nerve blocking offers no advantages over the use of general anesthesia in the patients now under consideration, and we have not employed it in this series of deliveries.

The anatomy of the central nervous system and its coverings in the region of the sacral nerves makes possible another fairly simple method of nerve blocking. The theca, or lower termination of the dural sac, is found quite constantly at the level of the second sacral vertebra, while the bony spinal canal continues to the sacral hiatus, a gap left by the failure of the fifth spinous process of the sacrum to form. This hiatus is bounded laterally by the sacral cornua and above by the fourth sacral spine, being thus a triangular area covered by a fairly resistant fibrous tissue, the sacro-coccygeal membrane, and giving direct access to the spinal canal. The space not occupied by the dura and its contents is known as the epidural space, and extends up around the dural sac to the level of the third cervical vertebra. In the sacral region this space contains the nerves of the cauda equina, loose areolar tissue, and a plexus of veins. The introduction of an anesthetic solution through the sacral hiatus into this epidural space makes possible the blocking of the sacral nerves without introducing the drug into the cerebro-spinal fluid, and this method is known variously as intrasacral, sacral, caudal, epidural and extradural anesthesia. The relative simplicity and great safety of this mode of blocking the sacral nerves led us to adopt it for the series of deliveries reported herewith, and a detailed discussion of its advantages and disadvantages will be found in connection with that report.

Two other methods of sacral nerve blocking of a central nature are of importance and must be considered. Presacral or parasacral block is accomplished by injecting a solution of procaine into the hollow of the sacrum following the line of the anterior sacral foramina in each side. The method is technically more difficult than the epidural injection, but is very effective and equally as safe, with the possible exception that the rectum may be punctured in making the injections. For this reason, trans-sacral nerve blocking is preferable when the epidural block is impracticable or unsatisfactory. In this method, the nerves are blocked by making individual injections into each of the posterior sacral foramina. The method is safe, free from untoward reactions, and gives quick and uniformly reliable anesthesia. It is technically considerably more difficult that the epidural injection. We have employed it in one case in this series, where bony abnormality rendered a satisfactory epidural injection impossible. Our only objection to its use in obstetrics is its complexity, and the fact that the simpler method gives satisfactory anesthesia in the majority of cases.

Of the more peripheral methods of blocking these nerves, two deserve mention. It will be remembered, from the brief resumé of the nerve supply of the uterus given above, that there exists on each side of the cervix a cervical plexus taking origin from the sympathetic nervous system, but also receiving fibres from the second, third and fourth sacral nerves. Taking advantage of this fact, a technique has been developed for blocking the nerves at this point, thus producing a paracervical anesthesia. As would be expected, this method eliminates uterine pain, inasmuch as it blocks the only afferent fibres. but it has no effect on the pain coming from trauma to the pelvic floor. For this reason it must be combined with another peripheral block, that of the pudendal nerve, and this can be accomplished without undue difficulty. Here again, the method is more complex and less comprehensive than the epidural injection, and for this reason we have not employed either of these nerve blocks in our series. The pudendal block, however, might prove to be of considerable value in supplementing an incomplete epidural anesthesia, and is a valuable bit of technique to have at one's command.

TECHNIQUE

For induction of epidural anesthesia, the patient is placed lying on her left side with the thighs moderately flexed on the trunk. The entire sacral area is then carefully prepared as for a surgical operation, thoroughly blocked off

with sterile goods, and the entire procedure is carried out with strict aseptic technique. The tip of the coccyx is palpated with the left index finger, which is then carried toward the sacrum until the cornua are felt. The fourth sacral spine is now found slightly above the cornua, and these three points outline the sacral hiatus. With a fine hypodermic needle, an intradermal wheal is raised over the midpoint of the hiatus, and through this the tissues down to and including the sacro-coccygeal membrane are anesthetized. An unbreakable lumbar puncture needle is now introduced at right angles to the membrane and advances until it meets the bony resistance of the anterior wall of the sacral canal. The sensation felt as the needle penetrates the membrane is definite and resembles that experienced in entering the spinal canal in lumbar and cistern puncture. The needle is now withdrawn slightly and its direction changed to accord with that of the sacral canal, into which it is now advanced three or four centimeters. The resistance encountered in this last maneuver may be almost imperceptible or may be sufficient to cause the needle to bend in accommodating itself to the curve of the canal. The stylet is now removed and aspiration through the needle is attempted by means of an empty syringe. If blood or spinal fluid is obtained the puncture of a vein or of the dural sac is shown, and the needle must be withdrawn slightly until this condition no longer exists; for the injection of the anesthetic fluid into the circulation or spinal fluid might easily prove fatal. This danger can be completely avoided by following the technique just described. In a series of several hundred such injections for various surgical procedures made by one of us (W. P.), spinal fluid has never been encountered but blood has been withdrawn not infrequently. Shifting the position of the needle has always stopped the flow, however, and in no case have any alarming symptoms followed the injection. The syringe filled with one per cent. procaine solution is now attached to the needle and the fluid is slowly introduced. If the needle is within the sacral canal, very little resistance to the free flow of the liquid is experienced; if force is necessary to complete the injection, the needle is not in the proper position, and it must be reinserted if anesthesia is to be obtained. The appearance of any subcutaneous swelling in this region during the injection is likewise an indication of failure to enter the canal. In the series of deliveries here reported we have used routinely forty cubic centimeters of one per cent. procaine without adrenalin. In a previous communication, we reported a series of one hundred epidural injections using 30 to 40 c.c. of one per cent. procaine with three minims of adrenalin 1/1000, and remarked that about one fourth of the patients had a transient tachycardia and palpitation, with occasional nausea and sometimes a sensation of impending disaster, hazarding the opinion that these symptoms were probably due to the adrenalin. Inasmuch as the adrenalin can serve no useful purpose in this type of injection, we have since omitted it entirely from our solutions with the exception of those used for terminal infiltration, and we have had no further reactions of the type just mentioned.

REPORT OF SERIES

We have used epidural block in a series of twenty-eight deliveries including two multiparae and twenty-six primiparae. The patients were taken in rotation, the only selection being the elimination of cases of obvious disproportion, as we desired to study spontaneous deliveries. Anesthesia has been complete in twenty-six of these. In one case access to the sacral canal was not obtained, as evidenced by a swelling posterior to the sacrum and the resulting lack of anesthesia. In another case considerable difficulty was encountered in making the injection because of bony deformity. Partial anesthesia lasting one and one-half hours was obtained, and this was rendered complete by the addition of a trans-sacral block when operative delivery by low forceps was decided upon.

In five patients complete anesthesia was obtained, lasting from one to three hours, but failing to outlast the duration of labor. Three of these resulted in low forceps operations due respectively to poor flexion of the head, disproportion because of a large baby, and poor coöperation on the part of the patient.

In addition to these there were three other low forceps operations, and it was found that the anesthesia was entirely satisfactory in each instance. The indications for these were (1) fetal distress—the heart suddenly dropping below 100 and remaining there; (2) premature separation of the placenta with the head on the perineum; and (3) mitral stenosis—to prevent undue cardiac strain.

The average length of anesthesia in the entire series was two hours; the longest three hours, the shortest one hour.

The average duration of labor after the injection in those patients who delivered spontaneously was forty-nine minutes; the longest one hour and thirty minutes, the shortest nineteen minutes. In nearly all of the primiparae the injection was given when the os was fully dilated, as closely as it was possible to determine by rectal examination. In two instances the os was not quite fully dilated and in two the head was bulging the perineum when the injection was given. In the two multiparae the os was six to seven centimeters dilated.

There were two second degree lacerations, one following a low forceps operation, the other in an elderly primipara, the babies weighing eight and one-half and seven pounds respectively. There were four lacerations of the skin or mucosa at the fourchette requiring but one suture.

In each instance the sutures were inserted without pain, with the exception of the patient who had anesthesia lasting but one hour, where a little nitrous oxide was required. The average weight of the babies was seven and one-fourth pounds, the largest weighing ten pounds three ounces, the smallest five pounds three ounces.

Anesthesia usually began about five minutes after the injection was completed, and was fully established in ten to fifteen minutes. After the full effect of the procaine was apparent, fourteen patients did not feel the contractions or know when they came on. Thirteen patients felt the contractions,—that is, they were aware of them through slight distress in the back or in the upper part of the uterus at the height of the contraction, but said they felt no pain with them. Nearly every patient needed continual coaching and urging to bear down and make use of the abdominal muscles.

The contractions stopped for five minutes shortly after the injection in one patient, then came on again at the same rate and intensity as before. In another they slowed in frequency and strength for twenty minutes, then came back as before and delivery was completed normally. In a third patient there was a slight inertia coming on about forty minutes after the injection; three minims of pituitrin were given and delivery progressed normally. In the instance of low forceps referred to above as due to lack of co-öperation from the patient, there is a question as to whether or not some inertia due to the anesthesia was partly responsible.

There were no untoward reactions of any importance. Several patients complained of tingling or pain in the legs or numbness during the injection, but this was slight and transitory. The pulse varied with the voluntary straining efforts, but there was no difference from other deliveries. We found no fall in blood pressure; it rose somewhat when the patient was moved into the delivery position and also during the delivery, according to the excitability of the patient.

The report of a typical delivery follows:

Case No. 6. Gravida i. Age 22. Previous history showed that the patient had suffered from a "nervous breakdown" in 1926. She had always been nervous, more markedly so just previous to admission. She had a mild hyperthyroidism; otherwise the physical examination was negative. The pelvic measurements were within normal limits. Labor began at term on Feb. 5, 1928, at 12 M. The os was fully dilated at 9:25 P. M. of the same day. An injection of forty cubic centimeters of one per cent. procaine was given into the sacral canal and completed at 9:47 P. M. She experienced some relief in five minutes and the anesthesia was considered complete at 10:00. She had a sensation of pulling in the abdomen for about fifteen seconds at the height of each contraction, but said that this was not painful. She was not aware of the contraction at all for about the first thirty seconds, and for a few seconds as it was fading away. Before the injection she had been complaining bitterly, was very excited, apprehensive, and uncoöperative. After it, she lay quietly on the table and co-öperated to the fullest extent. The head descended normally and as it reached the perineum it was allowed to distend it and to stretch the skin gradually. The muscles were perfectly flaccid so the head did not retreat between pains as in the usual patient without anesthesia. As it crowned and the operator could get his fingers beneath the chin, the patient was told to breathe easily and not to strain. She complied with these instructions, there being no pain or reflex stimulation to cause straining. The head was then gradually eased up and over the perineum, the operator retarding progress whenever blanching of the skin occurred. Several minutes being taken to bring the head over the perineum in this manner, no lacerations were received by the patient. The shoulders were delivered slowly and with care. The baby cried lustily before delivery was completed. It was delivered at 10:17 P. M. and weighed seven pounds and fourteen ounces. The uterus contracted promptly and the placenta was delivered spontaneously ten minutes later with only the usual amount of post-partum hemorrhage. The mother and baby both did well and the mother had a normal puerperium.

DISCUSSION

From our experience with this comparatively small number of patients we can conclude that the epidural injection of forty cubic centimeters of one per cent. procaine will result in anesthesia sufficient for spontaneous delivery or for delivery with forceps. The anesthesia is obtained whenever the injection is properly made, and makes possible the repair of any perineal tears which may be sustained. The thorough relaxation of the perineal musculature, however, is striking and is effective in reducing the number and degree of such perineal tears. The absence of pain when the head presses on the perineum results in abolition of the perineal reflex which normally results in voluntary straining with the abdominal muscles. In one respect this is a distinct disadvantage for it makes it necessary for the attendant to coach the patient constantly as to when to bear down, and may reasonably be expected to lengthen the duration of the second stage to a certain extent. Our records, however, do not show any undue prolongation of the second stage. In another respect the absence of this perineal reflex is of definite advantage. With the reflex present, we know that it is well nigh impossible to prevent straining at that critical moment when the perineum blanches and a tear is imminent. Under this anesthesia no such uncontrollable force is present, and all expulsive effort can be controlled by simply directing the patient when to bear down, with the result that the head may be delivered as slowly as may seem advisable.

The objections to the use of this method are several, and are of varying degrees of validity. It has been stated that it would be associated with a fall in blood pressure similar to that experienced in using spinal anesthesia. Careful study of this factor, as checked against the pressure changes in patients without anesthesia or under nitrous oxide and oxygen, fails to show any material difference. In no case has there been any definite fall in blood pressure. Again,

it is felt that sensory nerves cannot be blocked without there being brought about some interference with the motor functions of the uterus. Our previous consideration of the nerve supply of the uterus, however, shows that this is not the case, as the motor nerve supply is intrinsic. This is borne out by our experience, as in only one patient was there any material lessening in the force and frequency of the uterine contractions, and this was easily offset by the injection of three minims of pituitrin. We feel, furthermore, that any such interference with motor activity would be reflected in excessive postpartum hemorrhage from an inability of the uterine musculature to contract. In only one patient, again, was there anything approaching undue hemorrhage, and this was easily controlled by the injection of the active principle of ergot. Some observers feel that the inability of placing the patient in the prone position for the administration of the epidural injection is a great disadvantage. We have found it fully as easy to make the injection in the lateral position already described as in the usual prone position. A very real disadvantage of the method in our hands is that the anesthesia lasts only two to three hours and that it is difficult to determine just when to administer the procaine for its effect to be of the greatest value. In some of our earlier attempts, as previously mentioned, we obtained complete anesthesia which had entirely disappeared when delivery occurred. We met this difficulty in our later cases by giving the injection when the internal os was fully dilated, as nearly as we were able to determine. This, of course, limited its use to the second stage, and also made it most useful in primiparae. We believe that its usefulness could be extended materially by giving it somewhat earlier and repeating the injection if necessary, as we can see no objection to such repetition.

The possible dangers of the method must be considered. Cases of procaine poisoning have been reported by Elliott and others. Aside from rare idiosyncrasy to the drug itself, the majority of these cases probably represent injection of the solution into a vessel or into the subarachnoid space. This can be avoided by observing the precautions mentioned in the section on technique. Hall has reported a death from septicemia due to gas bacillus, this following necrosis of tissues from an injection made outside the sacral canal. A complication of this sort cannot fairly be charged to the method itself, as observance of the technique as described, including the employment of strict asepsis, will eliminate such occurrences.

At the present time, we consider that the use of epidural anesthesia is indicated in those obstetrical cases where general anesthesia is considered inadvisable, e. g., poor cardiac risks, toxic patients, diabetics, and patients suffering from acute or chronic pulmonary disease. As it is found possible to prolong the duration of anesthesia by repeated injections, we feel that the method will be employed to advantage in many patients who are now given general anesthesia.

The method is contraindicated when a patient is irrational or entirely unco-öperative, or when there is any infectious process near the site of injection. We have found no other contraindications.

SUMMARY

Regional anesthesia, as employed in obstetrics, comprises spinal cord block; blocking of the sacral nerves by epidural, parasacral or transsacral injection; or more peripherally by paracervical or pudic nerve block. After a study of all methods, epidural injection was selected as being technically simple and uniformly effective, and a series of twenty-eight such injections is reported. As a result of this study, it is felt that while this method now has a definite field of usefulness in the case of handicapped obstetrical patients, it is becoming increasingly useful for general application in obstetrics.

BIBLIOGRAPHY

1 Astley, B. G. M.: Spinal Anesthesia in Cesarean Section for Toxemia of Pregnancy. Am. J. O. and G., 1927, 13: 83.
2 Babcock, W. W.: Spinal Anesthesia in Gynecology, Obstetrics, and Abdominal Surgery. J. A. M. A., 1913, 61:1358.
3 Baum: Ueber Schmerzlinderung warend der Geburt durch die Stoeckel-Koblanck'sche Methode. Inaug.-Diss., Leipzig, 1909.
4 Berry, G. P.: Caudal Epidural Anesthesia in Perineal Surgery of the Genito-Urinary Tract. J. A. M. A., 1928, 90:1018.
5 Braun, H.: Local Anesthesia. Phil., Lea & Febiger, 1924.
6 Cooke, H. T.: Antagonistic Functions of the Uterus in Relation to Regional Nerve Blocking. Cal. and West. Med., 1926, 24:55.
7 Idem: Spinal Anesthesia in Obstetrics Including Cesarean Section. Am. J. Surg., 1923, 37:107.
8 Cosgrove, S. A.: Spinal Anesthesia in Obstetrics. Am. J. O. and G., 1927, 14:751.
9 Cotte, G.: Regional Anesthesia of the Uterus. Presse Méd., Jan. 13, 1923. Abs. J. A. M. A., 1923, 80:880.
10 Danis, R.: L'anesthesie Regionale du Petit Basin. Ann. et Bull. Soc. roy. d. sc. méd. et nat. de Brux, 72:160.
11 Davis, C. H.: The Evaluation of Methods in Obstetric Analgesia and Anesthesia. Am. J. O. and G., 1927, 14:806.
12 Elliott, D. C.: Intravenous Absorption after Caudal Block. Ken. M. J., 1927, 25:426. Also Am. J. Surg., 1927, 39: 122.
13 Farr, R. E.: Gynecological Operations under Local Anesthesia. Am. J. O. and G., 1922, 3:400.
14 Idem: Sacral Anesthesia; Some Practical and Experimental Points. Arch. Surg., 1926, 12:715.
15 Febres, E.: Uterine Anesthesia in Obstetrics and Gynecology by Injecting the Frankenhauser Ganglia. Bull. de la Soc. d. Obstet. et de Gyn., Dec., 1925. Abs. Practical Medicine Series, Obstet. and Gyn., 1926, p. 141.
16 Ferreyra, F.: La Analgesia Obstetrica par Inyessiones Epidurales de Novocaina. Cron. Med., 1916, 33:136.
17 Gellhorn, G.: Local and Spinal Anesthesia in Gynecology and Obstetrics. J. A. M. A., 1913, 61:1354.
18 Idem: Local Anesthesia in Gynecology and Obstetrics. S., G. and O., 1927, 45:105.
19 Goldstein and McBee: Caudal Anesthesia in Cystoscopy. J. Urology, 1926, 16:85.
20 Gwathmey, J. T.: Anesthesia. Phil., Appleton & Co., 1914.
21 Haines, Mumay and Faber: Caudal Anesthesia in Urology: A New Method for Locating the Sacral Hiatus. International Clinics, Series 34, 1924, 2:85.
22 Hall, L. S.: Septicemia Following Sacral Anesthesia. Am. J. C. and G.: 1927, 14:256.
23 Harris: Nerve Blocking. S., G. and O., 1915, 20:193.
24 Hoag, C. L.: The Application of Anoci-Association to Obstetrics. S., G. and O., 1916, 23:612.
25 Huggins, R. R.: Indications for and Dangers in the Use of Spinal Anesthesia in Obstetrics. Am. J. O. G., 1922, 3:412.
26 Ilmer: Zent. f. Gynak., 1910, 34:699.
27 Kehrer: Monatschr. f. Geburtsh. u. Gynak., 1915, 42:95.
28 King, R. W.: Perineal Anesthesia in Labor. S., G., O., 1916, 23:615.
29 Idem: Nerve Blocking in Labor. Northwest Med., 1916, 15:125.

30 Labat, G.: Regional Anesthesia, Its Technique and Clinical Application. Phil., W. B. Saunders & Co., 1922.
31 Laewen: München Med. Wchnschr., 1910, 57:2044.
32 Lewis and Bartels: Caudal Anesthesia in G. U. Surgery. S., G. and O., 1916, 22:262.
33 Lynch, J. M.: Sacral Anesthesia. Am. J. S. (Anesth. Sup.), 1918, 32:57.
34 Meaker, S. R.: Conductive Anesthesia by Intrasacral Extradural Injection of Novocain. Brit. M. J., 1919, 1:569.
35 Meeker and Bonar: The Value of Sacral Nerve Block Anesthesia in Obstetrics. J. A. M. A., 1923, 81:1079 and 1733.
36 Idem: Regional Anesthesia in Gynecology and Obstetrics. S., G., and O., Dec., 1923. Abs. Pract. Med. Series, 1925, p. 337.
37 Meeker and Frazer: Trans-sacral Nerve Block Anesthesia in Surgery of the Pelvic Floor and Viscera. S., G., and O., 1922, 35:801.
38 Mocquot, P.: Epidural Anesthesia. Revue de Chir., 1924, 62:120.
39 Mumey and Elliott: Caudal Anesthesia. Am. J. S., 1925, 39:39.
40 Oldham, S. P.: Sacral Anesthesia in Obstetrics. Am. J. S., 1925, 39:42.
41 Idem: Sacral Anesthesia in Obstetrics. Ken. M. J., 1923, 21:321.
42 Idem: Further Experiences and Results with Sacral Anesthesia in Obstetrics. Anesth. and Analg., 1927, 6:192.
43 Piantoni: Rivista Ospedaliera. 1913, 3:986.
44 Pickles, W.: Sacral Anesthesia. R. I. Med. J., 1925, 8:193.
45 Rielander: Zent. f. Gynak., 1910, 24:433.
46 Rucker, M. P.: The Use of Novocain in Obstetrics. Am. J. O. and G., 1925, 9:35. Abs. Pract. Med. Series, 1925, p. 128.
47 Schellekens, W. M. J.: Painless Childbirth. Nederlandsch Tijdschr. v. Geneesk., 2:2060. Abs. J. A. M. A., 1922, 78:556.
48 Schlimpert, H.: Concerning Sacral Anesthesia. S., G., and O., 1913, 16:448.
49 Idem: Deutsch. Med. Wchnschr., 1911, 37:719.
50 Schlimpert and Schneider: Menchen. Med. Wchnschr., 1910, 57:2561.
51 Schloessingk, K. E.: Sacral Anesthesia. Ill. M. J., 1915, 27:111.
52 Schneider, P.: Paracervical Anesthesia in Obstetrics. Med. Klin., 1926, 22:1293.
53 Schmidt, W.: Anesthesia of Pudendal Nerve in Obstetrics. Zent. f. Gynak., 1927, 51:2329.
54 Stoekel, W.: Ueber Sakrale Anesthesie. Zent. f. Gyn., 1909, 33:1.
55 de Takats, G.: Local Anesthesia. Phil., W. B. Saunders Co., 1928.
56 Thompson, J. E.: Anatomical and Experimental Study of Sacral Anesthesia. Ann. of Surg., 1917, 66:718.
57 Tobiaszek: Zent. f. Gynak., 1909, 33:1665.
58 Young, H.: Epidural Caudal Anesthesia, in Prostatic Surgery. J. A. M. A., 1928, 90:1021.
59 Zweifel: Zent. f. Gynak., 1920. Abs. J. A. M. A., 74:1138.

CYSTOCELE AT MIDDLE AGE TREATED BY THE INTERPOSITION OPERATION*

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THE interposition operation was devised by Dr. T. J. Watkins of Chicago for the treatment of cystocele and prolapse of the uterus after the menopause. There have been many operative measures proposed for the cure of these associated conditions which may be grouped as (1) vaginal plastic operations combined with abdominal suspension or removal of the uterus; (2) purely vaginal plastic operations with or without vaginal hysterectomy; and (3) the interposition operation in some one of its modifications. Each of these methods has its adherents and each undoubtedly has many excellent results to its credit. In our hands, the interposition operation has proved especially satisfactory in the treatment of cystocele after the menopause.

The causes of cystocele and prolapse are too well known to require comment. Though quite rarely it is nevertheless true that certain cases are apparently due to congenital or developmental defects in the supporting ligaments, muscles and fascia of the pelvis associated with uterine malposition (Cron). In our cases there was one nulliparous woman who had a well-marked cystocele with no apparent uterine descent. Such a case may be considered as a true hernia of the bladder. All writers agree that injury at the time of childbirth is the most frequent cause of cystocele and prolapse. Brady, reporting Cullen's cases, says that it is probable that the damage done at the first labor is more important than the number of pregnancies. Failure to repair adequately the soft parts after labor is, of course, an incidental and related cause of the condition. The atrophy of the pelvic viscera and the loss of tone of the pelvic muscles at the menopause are important factors in the production of cystocele in women who have borne children, and account for the increased frequency of cystocele and prolapse after the climacteric.

Associated with the cystocele and prolapse are lacerations of the pelvic floor in almost every case. It is also very common to find a marked elongation and hypertrophy of the cervix. It is essential that both of these conditions be considered in any operation devised to cure the cystocele.

In making a choice of method it is to be remembered that while cystocele and prolapse are very commonly the cause of much pain and disability, they, nevertheless, are not incompatible with life. We are not, therefore, at liberty to subject the patient to as hazardous a procedure for their cure as we might be if we were dealing, for example, with uterine cancer. In these women of midlife and beyond, an operation which can be done entirely through the vagina is preferable to an operation which necessitates not only a vaginal repair but also a laparotomy. It is generally accepted that a suspension of the uterus or an abdominal hysterectomy without a vaginal plastic operation will not cure either the cystocele or the prolapse. It is, to our mind, a distinct advantage to preserve the uterus when it is a normal organ and place it shelf-like beneath the bladder as an additional support. We do not feel that a hysterectomy should be undertaken if some other procedure which preserves the uterus will serve the purpose equally well.

The interposition operation has proved to be of great value in very obese patients, in whom a laparotomy is always to be avoided when possible. In patients with asthma, emphysema and chronic bronchitis, the use of the interposition

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operation with a low spinal anesthesia is safer than an extensive vaginal and abdominal operation.

The reports of the interposition operation by different writers show a very high percentage of cures—the figures being over 90 per cent. of good results in every article consulted. Thus Bullard reports 96 per cent. in the interposition operations at the Women's Hospital in New York. C. Jeff Miller reports 36 of 39 cases as good results. Brady, reporting 56 cases done by Dr. T. S. Cullen, found that 93+ per cent. were successful, and Cron, reporting a series of 225 patients, states that 90 per cent. had a satisfactory result. In our own experience we have found that 48 of 53 cases satisfactorily followed had a very satisfactory result—90.56 per cent.

We have performed the Watkins interposition operation on 63 patients with cystocele and prolapse, and have been able to learn the end results in 53 of these cases. In 30, or 56.6 per cent., of the 53 cases, the end result can be classed as perfect. Personal examination of these patients has demonstrated that there is no longer any cystocele or prolapse. Furthermore, the functional result is entirely satisfactory. Urination is normal in frequency and there is no evidence of any cystitis or incontinence. In 18 of the 53 cases, or 33.96 per cent., we have considered the end result as extremely satisfactory but not perfect. In this group of patients are some who have a perfect functional result but show on examination some slight descent of the bladder and uterus with straining. In no case of this group, however, did the bladder or uterus present at the vaginal introitus. Others in this group have excellent anatomical results but are subject to occasional attacks of cystitis, or occasionally, with heavy straining, have incontinence of urine. None of these patients, however, considered themselves as anything but cured by the operation. We believe, therefore, that 48, or 90.56 per cent. of the 53 cases, may properly be classed as cures with very satisfactory results from the viewpoint of the patient.

In two cases of the 53 (3.77 per cent.) the result must be classed as poor and unsatisfactory. In the first case, re-examined three years after operation, there is a definite descent of the uterus and the bladder. Urination is very frequent and because of this the patient is quite uncomfortable. No cystoscopy was permitted in this case. In the second case, two years after operation there was an excellent anatomical result. However, there was marked frequency and urgency of urination. Cystoscopy and cystograms showed no residual urine but a spongy trigonitis and posterior urethritis, possibly due to upper urinary tract infection. The symptoms were somewhat improved by four cystoscopic treatments by Dr. J. B. Hicks in the Clinic. It is of interest to note that this patient's chief complaint before the operation for cystocele was frequency and urgency of urination. Furthermore, this patient is the only one in the group who had not borne children.

In one case a curettage and removal of a cervical polyp was done at the time of the interposition operation. Five days later the pathologist reported a carcinoma of the fundus of the uterus from the curettings. This necessitated a complete hysterectomy. The hysterectomy in this case was preceded by a vaginal operation to release the uterus from its position under the bladder. The abdomen was then opened and a complete hysterectomy performed. The patient is at present—over a year after the operation—in excellent condition.

In the 63 cases investigated there were two deaths—a mortality rate of 3.17 per cent. One death resulted from a pulmonary embolus on the fifteenth day after operation, the patient being up and on her way home from the hospital. The second death was apparently from a peritonitis six days after operation. The operation was extensive in that a partial hysterectomy was done and the stump of the uterus interposed beneath the bladder.

It is obvious from our experience with this operation that the occurrence of unpleasant bladder symptoms is the prominent feature in the unsatisfactory cases and it is noticeable in the literature that the same difficulty has been reported by many other observers. Our two unsatisfactory results both had frequent and urgent urination as their chief complaint. Although there was no anatomical defect noted in one of these cases, there was a return of the cystocele with uterine descent in the other. Of the patients in whom the results are classed as satisfactory, although not perfect, the difficulty was in almost every case in some way related to trouble with the urinary function. Thus four of these patients were incontinent of urine on marked straining and five others had occasional attacks of cystitis with frequency and urgency of urination.

A few months ago, Dr. Hicks undertook to make a urological study of all cases of third degree prolapse, treated in the Clinic, having urinary symptoms before or after the interposition operation. This study was undertaken to rule out other urinary conditions that might cause the symptoms often ascribed to the cystocele and to determine what effect the operation might have in causing or relieving symptoms. This study has convinced us of the necessity of a thorough urological examination in all cases of marked prolapse and of benefit to be derived from treatment in cases with a persistence of symptoms postoperatively.

A total of ten cystoscopic examinations have been made,—six preoperatively and four postoperatively. Estimation of kidney function was done along with the cystoscopies by indigo-carmine given intravenously. Pyelograms were

made when indicated. Eight sets of stereoscopic cystograms were done. All the cases had tests for residual urine and sediment examinations before and after operation.

In two patients with symptoms, very little if any more marked than the others, there were serious urinary conditions requiring operation before attempting the repair of the cystocele and prolapse. In one there was an advanced pyonephrosis and first degree hydronephrosis of the remaining kidney, which functioned normally; in the other there was a vesical calculus about 5 cm. in diameter. Neither of these cases is included in the number of interposition operations and it is too early in their postoperative convalescence to determine what symptoms may be due to their cystocele alone. In two instances there was an ounce and a half of residual urine preoperatively. Postoperatively, when fully recovered from the operation, no residual urine was found.

The bladders were found to be of good tone and of rather large capacity in all cases both preoperatively and postoperatively. In every instance there was definite polypoid projection of the mucosa around the internal sphincteric margin with a varying amount of reddening of the posterior urethra and trigone. The urethra was definitely thickened and tender, as determined by palpating it against the pubic arch. Preoperatively, before the cystoscope could be inserted, the procidentia had to be reduced as the posterior urethra was drawn downward and posteriorly by the uterus and cystocele. Postoperatively, on cystoscopic examination, in addition to the inflammation of urethra, bladder neck and trigone, the floor of the bladder was elevated with varying degrees of folding of the mucosa in the transverse diameter. Some lateral pocketing was observed in all postoperative cases.

The cystograms were made in the reclining position only. These were interpreted as normal by the roentgenologist. Two patients had cystograms both before and after operation. By a careful study of these two, the only difference to be made out was a slightly higher placed bladder, postoperatively.

Four cases have been treated postoperatively. In three of these the treatment instituted was by dilatation of the urethra with large sounds, bladder instillations of weak solutions of silver nitrate and mercurochrome, and vigorous massage of the urethra against the pubis. Treatments were given at three to seven day intervals. Of these, two had an almost complete disappearance of urinary symptoms with six treatments. The third had an improvement from one treatment but lived so far from the clinic she could not return for additional treatment. The fourth, preoperatively, had an involuntary escape of urine with a full bladder when the desire to urinate came and she was unable to relieve herself, or when coughing, laughing, etc. There were no changes in symptoms after operation. In this case the cystogram was normal. There was no residual urine. On cystoscopic examination there was a very markedly reddened and granular posterior urethra and trigone and evidence of chronic bilateral pyelitis. She has made improvement from pelvic lavages combined with the above type of treatment, but is still quite uncomfortable and inconvenienced by her symptoms.

It has been suggested that the presence of a large fundus under the bladder might distort the trigone of the bladder and so give cause for bladder neck irritation and loss of sphincteric control. We had thought that it was more probable that a kinking of the lower ureter might well accompany the rotation of the uterus from its position above the bladder to the new one beneath it. Attempts to prove, however, with pyelo-ureterograms that this change of uterine position might, in turn, kink or constrict the ureters have been unsuccessful. It seems possible that the most logical explanation of the postoperative cystitis lies in assuming a ureteral stricture to be present. It is, of course, true that many of these patients with large cystoceles have infected bladders at the time of operation. From Dr. Hicks's studies, we know that in many of these cases there is a bilateral pyelitis and in some instances more advanced kidney infection and destruction. It is probable, therefore, that the majority of the postoperative urinary difficulties seen after the interposition operation are due to infection of the urinary tract present before operation. We now believe that cystoscopic study should be a routine procedure before the repair of a long standing cystocele.

We have operated successfully on one patient with intractable bladder symptoms after an interposition operation done elsewhere, in which the fundus of the uterus had been brought but a short distance beneath the bladder and so distorted markedly the inferior surface of the bladder. In this case, removal of the uterus from beneath the bladder and abdominal suspension of the uterine body relieved the frequency and urgency of urination.

The technique of the interposition operation which we have followed is practically that described by Dr. Watkins in his original communication in 1899. There have, of course, been numerous additions and alterations of his original technique suggested, but we have found the simple procedure the most satisfactory. It seems unnecessary to repeat the details of this method, since they can so readily be found in any standard textbook of gynecology. There are, however, certain points in the selection of cases for the operation that we wish to emphasize.

The interposition operation should not be performed in women who have not reached the menopause unless sterilization is carried out at the same time. We have observed one patient who became pregnant after this operation had

been performed elsewhere and the numerous reports in the literature of similar occurrences make it obvious that this fact is not generally understood. Pregnancy in a uterus interposed beneath the bladder is a serious complication and should not occur. Technically we have found the interposition operation inadvisable if the anterior vaginal wall is short and if the cervix or uterus is held firmly fixed high in the vagina. When the fundus of the uterus is large, it should not be interposed beneath the bladder. Too large a fundus placed beneath the bladder is a probable source of much irritation of the vesical neck and may cause marked urinary difficulty.

Partial amputation of an enlarged fundus and interposition of the remaining portion of the uterus beneath the bladder is a dangerous procedure. We have done this a few times successfully, but it is to be noted that our one avoidable death occurred from peritonitis after this procedure. It is possible that leakage from the endometrial cavity into the peritoneum may occur and for this reason we no longer employ this maneuver.

When the cervix is hypertrophied and elongated, it must always be amputated before interposing the fundus of the uterus beneath the bladder. In all cases, in our opinion, it is advisable to do a perineorrhaphy in order that adequate perineal support be provided for the pelvic viscera. Without such support prolapse is very likely to recur.

We believe that cystocele, when complicated by relatively little prolapse, is best treated by the interposition operation when it occurs in women who have passed middle age, because of the ease and rapidity of the procedure, the absence of shock and the probability that over 90% of cases will be completely relieved of their symptoms.

THE AFTER-CARE OF INFANTILE PARALYSIS

According to the U. S. Public Health Service, after-care is probably the most important public health function in an outbreak of infantile paralysis. In most cases this falls best upon the parents, who must first be trained by the family physician. It is the experience of the most qualified observers that better results are obtained from the combination of physicians and parent than where the management of the exercises have been left to an unskilled gymnast or masseur, who has neither the scientific knowledge of the physician nor the patience and personal interest of the parent. With all corrective measures, repeated trials are often necessary before the position, apparatus, or set of exercises best suited for the individual can be found, and changes from time to time are usually advisable.

The training of the muscles should be begun as soon as the patient's limbs can be moved freely without pain. In some cases this will be within three weeks after the attack, and in some others after a much longer period. It is possible also to accomplish a great deal for cases that have been neglected for years. Premature manipulations, on the other hand, and ill-directed exercises, have often greatly retarded or prevented the maximum recovery possible. Allowing patients to be on their feet too soon and too much has perhaps caused more crippling than any other factor in the care or lack of care of these patients. Weight bearing is very deleterious to weakened muscles.

The principles which underlie the training of muscles which have partially or wholly lost their power of voluntary contraction as a result of infantile paralysis do not in any way differ from those underlying the development of normal muscles. The result in both instances is the improvement in the nutrition of the muscle fiber and in the facility with which the nerves carry their impulses.

In infantile paralysis the beneficial effects of muscular contraction on the circulation may be in part supplied by massage, heat, passive movements, etc., and these measures undoubtedly do to a certain extent prevent the wasting away of the paralyzed muscles. Wherever there is, however, the ability to contract a muscle even slightly by an effort of the will, the muscle cells are more favorably affected by this contraction than by any quickening of the circulation by other means.

Seriously weakened muscles should be protected against cold at all times, against stretching, and against too much exercise. Any exercise may be too much at first.

In infantile paralysis certain nerve cells supplying a muscle are destroyed and those that are left, being unaccustomed to work together, perform their work badly without co-ördination.

The possibility of training nerves to work together with precision is shown in the formation of habits. Each time a partially paralyzed muscle contracts it not only improves the nourishment of its fibers, but also the co-ördination of the nerves which stimulate it.

The amount of improvement possible for any given muscle is, of course, proportionate to the number of uninjured nerve cells which supply it. This is an impossible thing to determine accurately and by far the safest plan in directing the exercises is to assume that every muscle is capable of attaining the normal.

In all exercise periods the whole attention of the patient should be required, or his ability to use his muscles will be much underestimated and the exercises will be much less effective. For this reason it is desirable that no person except the one who directs the exercises should be present. The presence of other children should be absolutely prohibited and no toys should be allowed. If the parents are ingenious the exercises themselves may be turned into an interesting game, without on that account making any sacrifice of precision in the performance of them.

The U. S. Public Health Service will be glad to furnish interested persons a copy of a set of exercises in muscle training which is recommended in connection with the after-care of infantile paralysis. It must be realized, however, that there is no royal road of progress in the treatment of the serious aftermath of this disease; intelligence, skill, care, perseverance, and courage are all required.—*United States Public Health Service.*

Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 14391

WEAKNESS AND LEMON YELLOW PALLOR

MEDICAL DEPARTMENT

A Scotch widow fifty years old entered May 3 complaining of weakness, a "run down feeling", and loss of weight. Her memory was poor, and the history was not believed to be altogether accurate. Involvement of the central nervous system was suspected.

A year before admission she began to feel very weak and to tire easily, so that she had to lie down after very slight exertion. She was then working by the day at washing and cleaning. One day she had great difficulty in getting home after her day's work, and on reaching home had a chill, felt very warm and fainted. She was in bed for two weeks. A physician made a diagnosis of pleurisy. Then she tried to work again, but could not. She steadily lost weight and strength, and had attacks of dizziness and fainting on the least exertion. Eight months before admission she began to have nausea after eating any but the simplest foods. She lost appetite and ate irregularly, only when she felt like it. Her bowels were very constipated, going sometimes two weeks without a movement. The stools were tarry and streaked with fresh blood. Six months ago she began to show a lemon tinged pallor and to have tingling of the fingers and toes, sometimes prickling. This had progressed. Sometimes her legs were numb and weak and would not bear her weight. Two weeks before admission she had pain and tenderness in the left lower quadrant. Her tongue became sore. Then her gums became sore and tender. This had persisted. Recently she had had numbness and aching in both shoulders and knees. Sometimes she felt as if she were walking on air. Since the onset of the illness she had urinated at night with increasing frequency, now seven or eight times a night. During the year she had had several short remissions with relapses.

Her past history shows nothing of significance. She had led a hard life of labor and had always been healthy.

Her mother died of heart disease. Two siblings died of tuberculosis and her husband also probably died of it. She was married five years with no pregnancies.

Clinical examination showed a fairly well developed and nourished gray haired woman in no acute distress. The skin showed an icteric pallor. The tongue was smooth, with some atrophy. The tonsils were small. There was cheesy exudate in the crypt on the left. There was a moderately high pitched early blowing systolic murmur, best heard at the apex. The lungs were normal. The liver edge was felt six centimeters below the right costal margin, smooth, with a nodule on the anterior surface. The left lobe of the liver, or one of three examiners thought the spleen, was felt 4 centimeters below the costal margin, moderately tender, with slight voluntary spasm and a questionable nodule. Another nodule was felt apparently in the abdominal wall in the left upper quadrant. Rectal examination was negative. There were dilated veins over the lower legs. Tuning fork tests and sense of position were normal. The reflexes were sluggish. The pupils were normal. Fundus examination could not be made because of bilateral cataracts.

Urine: amount not recorded, specific gravity 1.002 to 1.010, the slightest possible trace to a slight trace of albumin at both of two examinations, occasional leukocytes at both. Blood: 7,000 to 10,000 leukocytes, 52 to 68 per cent polymorphonuclears, hemoglobin 50 to 45 per cent, reds 3,200,000; two smears showed slight to marked anisocytosis, poikilocytosis and achromia, some tailed forms, slightly to definitely decreased number of platelets, several young polymorphonuclears once, large lymphocytes very granular once; average size of reds larger than usual for the degree of other changes; reticulated cells 1.6 per cent. Hinton negative. Non-protein nitrogen 27. Icteric index 1. Gastric analysis May 7. Fasting contents: very small amount of brown mucus, guaiac questionable, no free hydrochloric acid. Test meal: 40 cubic centimeters of brown material, 50 per cent food, guaiac strongly positive, no free hydrochloric acid, total acid 16. Stools negative. Pathological report on a fragment of mucous membrane from the tongue: chronic inflammation.

X-ray examination showed the esophagus normal. The stomach was in the normal position, somewhat atonic. A marked filling defect at the pyloric end was seen by fluoroscope and in all films taken. There was about 10 per cent residue at the end of six hours. Peristaltic waves were seen to begin as high as the midcardia, much higher than normal. The waves were not very vigorous and became dissipated before reaching the pylorus. None was seen to pass either on the greater or the lesser curvature over the region of the filling defect. The head of the barium colum was in the cecum at the end of six hours. Examination of the cervical

and upper thoracic spine was unsatisfactory.

Before operation temperature 97.9° to 100.2°, pulse 73 to 111, respirations 17 to 28.

The patient complained of pain in the right shoulder. May 8 there was spasm of the abdomen. The morning of May 9 she had increased abdominal pain and the abdomen showed board-like rigidity. The visiting physicians and a surgical consultant agreed that operation was indicated. That day it was done. May 11 the patient died.

Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

Certain things ought to come into everybody's mind upon reading that opening sentence,—vague, of course, but still suggestive. Of course since she was a widow past middle age we think in the first place of some of the diseases peculiar to women, some one of the diseases commonest in the latter half of life. The weakness, "run-down feeling" and loss of weight make us reflect that in the first place she is in the cancer age. Could this be a case of neoplasm? Then you say to yourself, "If it is it is not in any quite obvious place, not a cancer of the face, not a cancer of the breast. It might be cancer of the stomach, cancer of the kidney; not so likely to be cancer of the uterus, but it might be." So certain neoplasms are in your mind.

Then we think of the common circulatory diseases, especially those connected with hypertension and arteriosclerosis, which so often appear after fifty.

Then we think of diseases of the ductless glands, some of which are prone to appear at this age,—myxedema, and of anemias, primary and secondary. Of course we think of kidney trouble too, chronic nephritis.

"Involvement of the central nervous system was suspected." That narrows it a good deal in a direction that we have not been thinking of before.

Weakness and fatigue might be due to any one of the things we have been thinking about.

Chill of course makes us think of infection, but not of that alone. There are a great many so-called nervous chills in which people shake all over as patients' hands shake when they are nervous.

The visiting physician's diagnosis of pleurisy tends to make us think she had some infection there. I cannot tell. If he made a diagnosis of pleurisy what evidence should he have had?

A Student: Pain in the chest.

Dr. Cabot: Not that alone. There should be other physical signs.

A Student: Fluid or friction rub.

Dr. Cabot: That is about the whole of it. If it were thickened pleura—chronic pleuritis—it probably would not have come to notice at all. Do not make a diagnosis of pleurisy without one of those two signs. People often do it and should not. What is the likelihood of pleurisy at her age?

A Student: Not good.

Dr. Cabot: No, it is not probable. It is possible. I will venture to say that 90 per cent of the cases of pleurisy occur in people under forty, because it is an early sign of tuberculosis, and usually tuberculosis shows up primarily before thirty-five. This may be pleurisy, but I am suspicious about it just because of her age.

The loss of weight and strength could go with tuberculosis. It would go equally well with any circulatory trouble or possibly with any of the others that we mentioned in the beginning.

If you or I were taking care of the case we should begin to think of cancer of the stomach. We should not diagnose it, but we should think of it and look further for possible evidence.

Eating irregularly does not sound like cancer. Cancer does not have irregular appetite, it has a regular lack of appetite.

"Two weeks without a movement." That is a strong statement, but I believe it. I have seen people do that sort of thing. It makes us wonder if we make too much of constipation. When they go for weeks without any movement—I am sure that is true sometimes—we do not need to think it is more than constipation—intestinal obstruction—because in that case something more would have appeared—I mean pain and distention and vomiting.

I should not believe that report of tarry stools without first rate evidence. We often see that in histories; but no patient ever spontaneously states that he has had tarry stools. That is medical slang and patients are not used to it. It is brought out only by leading questions.

Tarry stools and streaks of fresh blood mean two opposite things. Blood from high up in the intestine gives tarry stools. Blood low down gives streaks of red.

The lemon tinged pallor is very much the most definite thing we have had yet. But nobody ever said that of himself. Probably after taking a good look at her the man taking the history said, "How long have you had that color?", and she said, "Six months", and he put down "Lemon tinged pallor". There are not many diseases which cause that. It suggests pernicious anemia, though other diseases, as myxedema, cancer and nephritis, can produce it. I am beginning to think much more definitely of one of the things we mentioned in the beginning—anemia, primary or secondary.

"Legs and feet would not bear weight." That makes us think of the various paralyses and cord lesions that often go with pernicious anemia. On the other hand it might perfectly well be weakness due to secondary anemia.

You can see the history man following this up

now,—lemon yellow color, tingling of the fingers and toes, sometimes prickling,—pernicious anemia. I do not say it is right. He is thinking of it.

"Two weeks before admission she had pain and tenderness in the left lower quadrant." You cannot tell much from that unless you get a good deal more information. It is not a common place for pain.

"Her tongue became sore." Pernicious again in mind.

"Sometimes she felt as if she were walking on air." That is paresthesia of the feet of course. It goes along with numbness and tingling.

"During the year she had had several short remissions with relapses." Pernicious again suggested.

As we read that paragraph on the present illness we cannot help thinking of pernicious anemia. Other things however are still possible, still in the background, and should be given further study.

A life of hard labor tends to rule out tuberculosis and many kinds of heart disease.

"Two siblings died of tuberculosis, and her husband also probably died of it." The important fact is not put in at all. I do not care in the least whether they had it. Was the patient exposed? Exposure to someone who was not in the family at all is much more important than the fact that someone in the family had it. The essential point is omitted here.

"She was married five years with no pregnancies." I do not know what five years that was. In the last five years the lack of pregnancy is not remarkable. In the early five years it might mean more.

Up to this point it sounds like pernicious, with all the other possibilities mentioned in the first few lines still in the background.

NOTES ON THE PHYSICAL EXAMINATION

"Fairly well developed and nourished." She probably has not had a long-standing neoplasm. On the other hand pernicious anemia generally presents that picture.

"The tongue was smooth, with some atrophy." So far as that suggests anything, what is it?

A STUDENT: Pernicious anemia.

DR. CABOT: It is rather more suggestive of syphilis. In pernicious anemia the tongue is not always smooth, and the soreness already mentioned is characteristic of tertiary syphilis.

What else do we need to know about the heart? Whether it is enlarged. The size is much more important than that murmur. That might mean anything or nothing. The size is a positive fact and always means something. Presumably they found it was not enlarged. I assume also that there is no arrhythmia, which is equally important and is not mentioned.

What are we going to say about that liver? In the first place, as to the size. Is it enlarged?

A STUDENT: Yes.

DR. CABOT: Are you sure? Are there any possibilities of its not being enlarged? It depends on the shape of the costal arch. If it is very high you may feel the liver down as far as that. We are not told at what point the measurement was 6 centimeters. In the nipple line, I suppose. That is quite possible without any enlargement of the liver. We are not sure, but in the majority of cases, probably yes, enlarged. But we have no proof of it.

What about that nodule? You feel somewhat uncertain. One swallow does not make a summer or one nodule cancer of the liver. Yet if it is not cancer I do not know what to say. Syphilis, cirrhosis, cancer—it does not quite fit any of them. This is the sort of thing you have to leave undecided for the present moment and see what the rest of the case offers.

"Slight voluntary spasm and a questionable nodule." Two is a good deal more than one. Still they question it.

"Another nodule was felt, apparently in the abdominal wall in the left upper quadrant." That begins to be interesting. If there was one nodule in the abdominal wall why not more? One often does not feel them in the abdominal wall because of fat. If they have one it is quite possible that the other is the same.

The reflexes were sluggish; nothing really abnormal. Sluggish means within the normal.

What should be said in question or criticism of that urine examination so far?

A STUDENT: It was not a catheter specimen.

DR. CABOT: It was not a catheter specimen as far as we know. If it is not it may be mixed with vaginal discharge, which may show albumin and cells. Those are significant only when urine is withdrawn by catheter. Therefore these tests are of no importance in a woman. It is entirely different in a man.

A red count of 3,200,000 is of course very important.

"Average size of reds larger than usual for the degree of other changes." That is rather a vague statement. I should not like to say exactly what that means.

"Reticulated cells 1.6 per cent." That is about twice the normal. But it does not help us very much as to the kind of anemia.

The icteric index is low. I have some doubt as to whether or not it is correct.

Of course many conditions such as we are thinking of in this case will produce achylia like that.

In getting the pathological report on a fragment from the tongue I suppose they were thinking of syphilis.

There is no diagnosis in my mind yet, I think none in theirs. All we know is a fairly marked anemia which might be primary or secondary,

might be pernicious or non-pernicious so far as we have gone.

* * * * *

But that X-ray is practically diagnostic. You have of course to judge your X-ray man. Is he capable of excluding artefacts of one kind or another that might give the appearance of filling defects? This is a very flat footed statement. As far as I know it means only one thing,—cancer of the stomach.

"The waves were not very vigorous and became dissipated before reaching the pylorus." I do not know the significance of that. We need an X-ray expert to tell us what he is thinking of there.

"None was seen to pass either on the greater or the lesser curvature over the region of the filling defect." That is very important. That is, if you have an infiltrated cancerous portion the peristaltic wave stops when it gets there and does not go over it.

There was no marked pyloric obstruction. Some cancers obstruct, some do not.

"The morning of May 9 she had increased abdominal pain and the abdomen showed board-like rigidity." What does that make us think of?

A STUDENT: Peritonitis.

DR. CABOT: Yes. You naturally think of perforation in the stomach and peritonitis—perfectly possible—not uncommon in gastric cancer.

And so they operated. No one is to blame for giving the patient the only chance. If I were in that situation I should want to be operated on, realizing that the result might probably be fatal, still taking the only chance.

DIFFERENTIAL DIAGNOSIS

There are some benign tumors in the stomach that will cause a filling defect. Hair balls can cause a filling defect, but never secondary anemia. She has an anemia which can perfectly well be secondary. The symptoms of the whole of the first paragraph are the symptoms of a person suffering from anemia. That nodule looks more important now that we have reason to believe that the ordinary sequence of events in the liver in cancer of the stomach is present.

On looking back in the end I should say we have no evidence to incriminate the kidneys, no reason to suppose disease of the central nervous system or the genito-urinary system. Everything points in one direction. Everything shapes itself up to one diagnosis, cancer of the pyloric end of the stomach, secondary anemia, probably with nodules in the liver.

A STUDENT: How about the sore tongue?

DR. CABOT: The man who took the history was thinking very hard of pernicious anemia. I think he was asking leading questions.

A STUDENT: Is not the color index high for secondary anemia?

DR. CABOT: Yes; but hemoglobin measurements you know are not very reliable, and the other features of the blood go with secondary anemia, especially achromia, which is never seen in primary anemia. In almost every case we have to disregard something. We should like to disregard nothing, and of course if all the observations were correct we should not have to disregard anything. We have to say that we make this diagnosis in spite of sore tongue and rather high hemoglobin and other points. Can this be pernicious anemia? Can it cause a filling defect at the pylorus? I should say no. I do not think it is possible.

A STUDENT: Is the high white count in favor of pernicious anemia?

DR. CABOT: I should not call it high. It is the upper limit of normal. You usually get a subnormal white count. But there are a good many cases of this kind.

A STUDENT: How about the "fairly well developed and nourished"?

DR. CABOT: A cancer of the stomach should not be fairly well developed and nourished. That is surprising. We have to make the diagnosis in spite of that, if we make it; perhaps you do not.

A STUDENT: Is it not possible to have pernicious anemia and cancer of the stomach at the same time?

DR. CABOT: That has been seen. I suppose it is possible here. The cases I have known or heard about were cases where the cancer was so small that it played no part in the case. I have never heard of the combination in a case as extensive as this is. Cancer does not prevent us from thinking of pernicious anemia, but I think it is true that they almost never coincide.

A STUDENT: How is the nycturia explained?

DR. CABOT: I do not know. But I believe the kidneys will be normal. She was not taking much solid food, perhaps living on liquids, and that would perhaps explain the nycturia.

A STUDENT: It might be cystitis?

DR. CABOT: Possibly, but the sediment does not look like it.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Carcinoma of the stomach.

DR. RICHARD C. CABOT'S DIAGNOSIS

Cancer of the pyloric end of the stomach.
Perforative peritonitis.
Probably metastases in the liver.
Secondary anemia.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Adenocarcinoma of the stomach with metastases and perforation.

2. *Secondary or terminal lesions.*

Fibrous myocarditis.
Edema of the lungs.
Peritoneal abscess.

DR. TRACY B. MALLORY: A cancer of the stomach was present, very rapidly growing, which probably accounts for the fact that her nourishment had not suffered so much as is usual in cases of cancer of the stomach. My record says that she was poorly nourished; but of course there is wide difference of opinion in subjects of that sort. The cancer was a large one extending back from the pyloric ring over nearly half of the anterior surface and greater curvature of the stomach, invading the gastrocolic omentum and the greater omentum. There were also nodules in the gastrohepatic ligament. Metastases were present in the liver, one of which was close to the margin of the right lobe and I think is without question the nodule felt and described in the history. Another nodule was in the left lobe and is probably the mass over which the question of spleen came up.

The pleural cavities were free. There were no adhesions. I think it is not probable that she had pleurisy recently or we should have found some signs of it.

The kidney showed a very slight trace of nephritis microscopically,—nothing in gross—hardly a sufficient amount to be diagnosed clinically.

A STUDENT: Was the heart all right?

DR. MALLORY: Yes.

DR. CABOT: Was the liver enlarged?

DR. MALLORY: Considerably.

A STUDENT: How about the spleen?

DR. MALLORY: Not enlarged.

DR. CABOT: Was the bone marrow examined?

DR. MALLORY: No, sir.

DR. CABOT: So they can say it was pernicious too. Can you say positively that it was not pernicious too?

DR. MALLORY: No, I cannot.

DR. CABOT: You do not believe it, do you?

DR. MALLORY: I doubt it very much.

DR. CABOT: A little point to store away in memory—there is a murmur in the description, but Dr. Mallory says the heart is negative post mortem. People say, "What do you mean by a functional murmur?" I say that it is such a murmur as shows nothing post mortem. I agree that the word functional is a very bad word. I agree that any other word for these murmurs is bad. If you hear a murmur which is systolic in time, present only at or near the apex, and every other fact about the heart is negative, call it functional,—in other words unimportant. The facts you want are enlargement, arrythmia, changes in blood pressure. With a normal sized heart, normal blood pressure, normal rhythm, pay no attention to systolic murmurs.

CASE 14392

AN UNUSUAL CAUSE OF LEFT LOWER QUADRANT PAIN

SURGICAL DEPARTMENT

A Lithuanian laborer sixty-eight years old entered June 29 complaining of epigastric pain of two years duration. He had language difficulty and appeared senile. His history was thought less reliable than the Out-Patient Department records.

Two and a half years before admission, while lifting a heavy table, he felt something give way in his abdomen. That night he had severe epigastric pain with diarrhea. He went to a hospital and was studied for nine weeks. Here he seems to have had his back strapped for sacroiliac strain, with relief. On his discharge he was able to go back to work as a furniture mover. He had constipation alternating every two to three days with watery diarrhea. After eating he had a good deal of belching. An hour after meals pain started in the epigastrium and radiated down the abdomen to the left lower quadrant. He then had a small pencil movement followed by left lower quadrant pain; then another movement and more pain. For a year he had had pain on defecation. For six months he had not slept more than an hour at a time because of frequent urination and almost constant left lower quadrant pain. On April 13, two months and a half before admission, he went to the Out-Patient Department complaining of heart-burn and the pain etc. already mentioned. His weight had fallen from 150 a year ago to 131 pounds. He had lost strength. X-ray with a barium meal showed the stomach empty after six hours. Peristalsis was deep and vigorous. The pyloric portion of the stomach appeared displaced to the left. The duodenum emptied directly behind the antrum and was very difficult to visualize. As far as could be determined it was normal, but this finding was by no means certain. The head of the barium column was in the cecum at six hours. A barium enema was expelled. The examination was unsatisfactory. On May 4 he still complained of pain with belching and also of pencil type stools. The epigastric pain was worse at night. He had lost nine pounds in three weeks. Rectal examination showed a questionable mass above the prostate. Proctoscopy showed no abnormality. May 18 the symptoms were the same. May 25 he had vomited once since the last visit. June 8 the pains continued the same. He was afraid to eat because of them. He vomited two or three times daily. The vomitus was green. His weight was 117 pounds. His breath was foul.

His family history is not significant.

In giving the past history he could not understand names of diseases, but said he had been ill very few times in his life. At twelve he had

an acute occiptal headache relieved by "cutting a piece of bone loose and sucking bloody fluid out". Over twenty years ago while working in a cold shop with water running over his arm he had rheumatism in the arm for two years. He had two or three coryzas every winter, with sore throats and hoarseness. There was a doubtful history of palpitation. He drank wine and beer. Before his illness he smoked a great deal.

Clinical examination showed a markedly emaciated elderly man (weight 109 pounds) lying doubled up on his left side. Skin dry. Irregular areas of erythema over the abdomen. Tongue dry. Breath foul. Bean sized inguinal glands extending down vertical chain. On the left two or three above the pubis. Prominent veins over the chest. Depression above the xiphoid. Lungs not remarkable. Heart slightly enlarged. Left border of dullness 9.5 centimeters from midsternum, 1.5 centimeters outside the midclavicular line, right border 2 centimeters, supracardiac dullness 6.5 centimeters. Sounds and action normal. No murmurs. Peripheral vessels hard and tortuous. Traube's space dull. Blood pressure 150/98. Abdomen moderately distended but soft. Prominent lower abdominal veins. Shifting dullness in the flanks. No fluid wave. Slight tenderness in the right upper quadrant on deep pressure. No masses or organs made out. Rectal examination induced defecation of yellow watery stools. A mass was felt above the prostate. Right pupil slightly irregular. Both reacted to light and distance. Arcus senilis. Knee-jerks and right ankle-jerk sluggish. Left ankle-jerk not obtained. Moderate varicosities of the extremities.

Before operation urine not remarkable except for a very slight trace of albumin in one of four specimens. Blood normal at three examinations. Two Hinton tests and one Wassermann negative. Fasting contents of the stomach: 50 cubic centimeters of thin cloudy fluid, free hydrochloric acid 18, total acid 21. Test meal: 55 cubic centimeters of thin cloudy mucoid fluid, free hydrochloric acid 36, total acid 54. Guaiac negative in both specimens. Stool: guaiac negative July 5, strongly positive July 6.

The afternoon of June 30 the patient had much lower abdominal pain, making him stay on his hands and knees. Rectal examination showed a hard irregular fixed mass the size of a lemon anteriorly in the region of the bladder, apparently superior to the normal position of the prostate, though the prostate was not felt. The mass obstructed only partially or not at all. Pressure beneath it produced intensification of the lower abdominal pain.

July 10 operation was done. The patient made a good operative recovery and a good convalescence, and complained little until July 22. Then he had some lower abdominal pain, vomited once and seemed much weaker. The temperature was 99.4°. He grew steadily worse and July 26 died.

Discussion

BY EDWARD L. YOUNG, JR., M.D.

The two things which stand out are the bladder symptoms and the left lower quadrant pain associated with movement of the bowels. There is not very much which we have to consider in the left lower quadrant. In a man of sixty-eight we always think of malignant disease first. He has gone a long time, but we have seen patients go longer. So this man went on for nine months and did nothing for it.

To-day with the technique which they are able to use in giving barium enemas the fact that an enema cannot be tolerated is I think significant, meaning some obstruction in the large bowel.

Induced defecation and a palpable mass taken together are important, assuming that we can rule out the feeling of something because of the wish to feel it. If we can believe there is something there and the proctoscope passed it by, it was probably attached to the wall outside and was not a mass inside. That of course brings to mind diverticulitis with an inflammatory mass.

At sixty-eight I do not think moderate varicosities mean anything.

It seems to me we must try to make a diagnosis of what this is in the light of two years and a half of pain in the lower quadrant together with the bowel irritation, and in the bladder a mass which is not inside the lumen, nevertheless is definitely attached to it, which has been there at times and apparently was not felt at other times. It seems to me that diverticulitis with an inflammatory mass about it fits the picture best.

We have to remember that malignant disease can develop in a diverticulitis that has existed for a great many years. We have no evidence from a barium enema, which is the best aid we have in recognizing the presence of diverticulitis. Can it be malignant disease outside the bowel? We can not rule that out. Can it be a tumor of the bladder? No; two years and a half would give more evidence of tumor in the bladder itself than this has given.

It seems to me that I should operate on the basis of diverticulitis, and should operate with the feeling that I was not going to cure.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Diverticulitis of the intestine with an inflammatory mass.

PRE-OPERATIVE DIAGNOSIS

Carcinoma of the rectum.

OPERATION

Gas and ether. The abdomen was opened through a midline incision with the escape of about four liters of milky fluid, apparently chylous in character. There were diffuse implantations in the peritoneum. The omentum was particularly involved, forming several bands which appeared likely to strangulate the bowel. Some of these bands were excised. The pelvis showed a large amount of cancer. It was not possible to state where it was primary. Obstruction might occur anywhere in the abdomen and seemed likely to take place at the ileocecal valve, where there were carcinomatous nodules. On this account a colostomy did not seem advisable.

PATHOLOGICAL REPORT

An irregular fragment of fat from the omentum.

On microscopic examination it was filled with small gland tubules lined with mucous epithelium the appearance of which suggested a primary tumor in the gastro-intestinal tract.

Metastatic adenocarcinoma.

Further Discussion

Whoever felt this mass got a somewhat different impression from the picture given us, because the pre-operative diagnosis is carcinoma of the rectum, definitely. I think it was outside the bowel, because the proctoscope apparently went over it and did not give any clear cut picture.

I do not think we know very much more as to the primary source of the growth. Of course with that story there is nothing else that can come into the picture except what we read here, except that he might have slipped out a little sooner. His temperature went up and he grew steadily worse and died, possibly of a peritonitis, possibly of obstruction, possibly of nothing but the cancer itself.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Carcinoma of the intestine.
Peritoneal carcinomatosis.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Carcinoma, primary region unknown.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Carcinoma of the tail of the pancreas.
Cancerous peritonitis.
Cancerous invasion of the spleen and the left kidney.

2. *Secondary or terminal lesions.*

Bronchopneumonia, slight.

Dr. Tracy B. Mallory: The original source of the tumor in this case was not diagnosed, and probably it was impossible to diagnose it. It is another case of carcinoma of the tail of the pancreas, consequently producing no bile stasis. It was unusual in that it had directly invaded the spleen and the left kidney. I presume that most of his local symptoms were a result of the diffuse cancerous metastases on the serous surface of the gut, which had led to marked constriction. It seems possible, however, that the invasion of the kidney may have led to some bladder pain referred from the kidney region and so actually caused by the primary tumor rather than by the metastases. The back symptoms which led to his first hospital visit may also have been directly referable to the primary growth.

Dr. Young: I am glad I was nearer right than the other man in saying that it was outside the bowel.

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HONEST ADVERTISING

THE JOURNAL has before this called attention to the commendable policy of *The New York Times* as regards the advertising material which it will accept for its pages. Now that the New York Tuberculosis and Health Association has openly expressed its approval of this policy, it may not be amiss to call it again to the attention of our readers. The Twelve Commandments of *The New York Times*, setting forth in detail what it declines for its columns are as follows:

1—Fraudulent or doubtful advertisements.
2—Offers of something of value for nothing; advertisements that make false, unwarranted or exaggerated claims.
3—Advertisements that are ambiguous in wording and which may mislead.
4—Attacks of a personal character; advertisements that make uncalled-for reflections on competitors or competitive goods.
5—Advertisements holding out the prospect of large guaranteed dividends or excessive profits.
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7—Advertisements that are indecent, vulgar, suggestive, repulsive or offensive, either in theme or treatment.
8—Matrimonial offers; fortune telling; massage, unless licensed and license number is given.
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10—Advertising of products containing habit-forming or dangerous drugs.
11—Help Wanted advertisements which request money for samples or articles.
12—Any other advertising that may cause money loss to the reader or injury in health or morals, or loss of confidence in reputable advertising and honorable business, or which is regarded by *The Times* as unworthy.

The majority of our Boston newspapers, certainly, entertain no such ideals about their service to the public. A moral little paragraph is frequently published entitled Truth In Advertising, but it is a sop to Cerberus; it is not even intelligently used as a smoke screen, for it may appear on the same page with advertisements which outrage common decency. No; our Boston newspapers on the whole believe in no Advertising Index Expurgatorius, for even the revered *Transcript*, which always means well, is not above making its sacrifice to Mammon in the form of Marmola.

THE WAR ON OPIUM

THE Geneva Convention having been ratified, more results in the war on opium may be expected, according to Mr. John P. Gavit, in *Survey*. The Convention provides for the setting up of a "Central Board" of eight persons, appointed by the Council of the League, whose function it will be to keep watch of the international traffic in narcotics and to notify the Governments when it is illicit. Mr. Gavit, however, is not optimistic as to the character of the board which is likely to be appointed at the start, for the Assembly has little enthusiasm for the new organization, and the opposition to the expense may prevent adequate salaries. If, however, the Board is such as to command respect, he believes that it will gather to itself in any country a body of informed public opinion which will give it added power.

BARNSTABLE COUNTY MILK

THE boards of health of Barnstable County have agreed that after June 1, 1929, no milk may be sold or distributed in that County unless either produced by tuberculin tested cows or pasteurized.

Large cities in this State are working under these requirements.

It should be generally recognized that certified milk from tuberculin tested cattle may be unsafe because of infected udders which may not have been recognized.

Milk that has been pasteurized and not contaminated by handlers is practically safe.

We look forward to the time when all milk consumers will either purchase pasteurized milk or learn how to carry out this technic.

If the greatest possible safety is desirable for those living in cities, why not for individuals in small towns? We may in time come to regard raw milk as little better than raw meat.

A JOINT MEDICAL INFORMATION BUREAU

THE New York Academy of Medicine and the Medical Society of the County of New York have established a medical information bureau at 2 East 103rd Street in the New York Academy of Medicine. This organization is supervised by a committee representing the Academy and the County Medical Society. More than one hundred experts will co-öperate in furnishing information with respect to their several specialties.

The specific function of this organization is to give to the public advanced reliable information relating to therapeutic and preventive medicine.

This authoritative information will bring the people and physicians into closer contact in all matters of interest relating to the application of medicine, in its broadest sense, to human welfare.

It will also incidentally teach the public to avoid quackery and will give information to persons and newspapers.

Under this plan there will be no excuse for misleading newspaper reports with respect to medical affairs or discoveries, for this agency will provide exact and full information.

This plan is most reasonable because intelligent people are becoming more and more appreciative of scientific medicine and welcome reliable information. The menace of the quack must be met by open and frank discussion.

This will put the mendacious current publication on the defensive and give the honest newspaper an advantage.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

CHEEVER, AUSTIN W. A.B., M.D. Harvard, 1914. Chief, Department of Skin and Syphilis, Boston Dispensary. Dermatologist, Cambridge Hospital. Visiting Dermatologist, Beth Israel Hospital. Consultant Dermatologist, Brockton Hospital and Goddard Hospital, Brockton. Address: 472 Commonwealth Avenue, Boston. Associated with him is:

SPLAINE, RUSSELL L. M.D. Tufts, 1920. Assistant in Department of Syphilis at Boston Dispensary. Assistant in Urology, Massachusetts General Hospital. Their subject is: "The Hinton Glycerol-Cholesterol Precipitation Reaction". 1—A Comparison with the Wassermann, Kahn, and Slide Tests in Sixteen Hundred Cases. 2—A Diagnosis Criterion of Syphilis. 3—As A Means of Indicating the Necessity of Continued Treatment. Pages 967, 971, 973. Address: 78 Commonwealth Avenue, Boston.

HENDERSON, YANDELL. B.A., Ph.D. Professor of Applied Physiology, Yale University. His subject is: "Resuscitation from Asphyxia in the New-born and Others". Page 977. Address: Yale University, New Haven, Conn.

SWORD, BRIAN C. M.D. New York Homeopathic Medical College and Flower Hospital, 1918. Attending Anaesthetist of Grace Hospital, New Haven. Consulting Anaesthetist, New Haven Community Center. President of the Eastern Society of Anaesthetists. His subject is: "Remarks on Causes of Asphyxia of the New-born and Resuscitation". Page 979. Address: Grace Hospital, New Haven, Conn.

CHADWELL, ORVILLE R. M.D. Boston University School of Medicine, 1903. Professor of Pediatrics, Boston University School of Medicine. Pediatrician, Robinson Memorial Hospital. Consulting Pediatrician, Haynes Memorial Hospital. Physician-in-Chief, Children's Service, Massachusetts Homeopathic Hospital. His subject is: "Impetigo Neonatorum". Page 983. Address: 510 Commonwealth Avenue, Boston.

O'BRIEN, FREDERICK W. A.B., M.D. Tufts College Medical School, 1911. Associate Professor of Radiology, Tufts College Medical School. Visiting Roentgenologist, Boston City Hospital, Boston Sanatorium, Cambridge Municipal Hospital and Visiting Physician, Department of Physical Therapeutics, Boston City Hospital. His subject is: "Cancer of the Tongue and Floor of the Mouth". Page 985. Address: 465 Beacon Street, Boston.

SHATTUCK, GEORGE C. A.B., A.M., M.D. Harvard Medical School, 1905. Assistant Professor of Tropical Medicine, Harvard School of Public Health. Junior Visiting Physician in Charge of the Services for Tropical Diseases, Boston City Hospital. His subject is: "Scurvy, Pellagra, and Sprue at the Boston City Hospital". Page 986. Address: 520 Commonwealth Avenue, Boston.

PICKLES, WILFRED. A.B., D.N.B., M.D. Harvard, 1922. Second Assistant Visiting Surgeon, Rhode Island Hospital; Regional Anesthetist to Rhode Island, Providence Lying-In, and Providence City Hospitals. Surgical Consultant, Westerly Hospital; Associate Medical Director and Assistant Professor of Biology, Brown University. Address: 76 Waterman Street, Providence, R. I. Associated with him is:

JONES, SCOTT S. Sc.M., M.D. Rush Medical College, 1923. Resident, Providence Lying-In Hospital, 1927-28. Attending Obstetrician and Gynecologist, County Hospital, Tacoma, Wash-

ington. Their subject is: "Regional Anesthesia in Obstetrics". Page 988. Address: 1513 Washington Building, Tacoma, Washington.

CLUTE, H. M. B.S., M.D. Dartmouth, 1914. F.A.C.S. Surgeon, Lahey Clinic, Boston. Assistant Surgeon, New England Deaconess Hospital. Assistant Surgeon, New England Baptist Hospital. His subject is: "Cystocele at Middle Age Treated by the Interposition Operation". Page 994. Address: 605 Commonwealth Avenue, Boston.

THE BOSTON MEDICAL LIBRARY

DR. JAMES LLOYD

1728-1810

ONE of the constantly recurring names in the medical history of Colonial times is that of Dr. James Lloyd. The connection in which many, if not most, of these references occur is in the citation of his name as the teacher of one after another of the men who cared for the medical ills of the Colonists. The relations which those of that period, whose reputation as practitioners attracted men to them had to their students, must have constituted a very gratifying association, not only at the time but all through life. That relations thus established were a source of great enjoyment to the apprenticed physicians is abundantly confirmed by the writings of these men. In these days, when the apprentice in medicine is almost unknown, there is little opportunity to come into such close personal relations with one's teachers and the loss is one that cannot be made up by any of our modern teaching methods. Occasionally in a hospital service something like those contacts of the "preceptor" days may be had and for those who have experienced them I am sure they are among the happiest memories recalled. For the students of medicine of that period it is probable that they were peculiarly valuable, for most all those who eventually had men seek to attach themselves to them in the apprentice relationship, were men of marked ability who almost invariably had sought to perfect themselves in the arts of practice by going to Great Britain or the Continent, to complete, or better, to supplement their studies. They were either naturally inclined or felt it their duty to impart that which their superior advantages had furnished them. At that period in Europe and Great Britain there were many "masters of medicine" who were flattered by the influx of foreign students and often gave them exceptional opportunities. Whatever the system of education lacked, which in these days we regard as essential, was compensated for to a considerable extent by the intimate associations of the apprenticed students with the master minds of American medicine, who brought first hand to their students the knowledge and inspiration of the foremost teachers abroad. Wherever this method has obtained and at whatever time, the results have always been superior to class room methods. Dr. James Lloyd was one to whom these experiences came. He was descended from a family of culture and education, the first member of it to come from Somersetshire in England to this country being his grandfather who settled in Shelter Island somewhere about 1670. It is recorded that one of his ancestors was a physician to Queen Elizabeth. He was the youngest of ten children and was born on Long Island in April 1728. He received his early schooling at Stratford and New Haven, Connecticut, forming a friendship at that time with Samuel W. Johnson, later President of Columbia College; this continued through their lives. When he was 17 years of age he left Connecticut for Boston where he had two brothers. Here, for five years, he studied medicine with Dr. Clark, one of the most eminent practitioners of his time. When he was twenty-two he sailed for England, where he spent two years in the London hospitals and attended the lectures of Cheselden, Sharpe, William Hunter, William Smellie, the obstetrician, and Joseph Warner, a surgeon to Guy's Hospital. Shortly after his return to America in 1752 he was appointed surgeon to a British military hospital on Castle Island, Boston Harbor. His surgical training with Cheselden put him to the front among the surgeons of Boston and it is claimed that he was the first to perform a lithotomy in Boston, if not in New England. He also first employed ligatures here, in place of the cautery, to control hemorrhage. He was soon compelled to give up his position at Castle Island on account of his rapidly increasing practice. So busy was he that it was said he never, for a period of several years, enjoyed a complete night's rest. During this period, 1758 to 1775, he had a great many pupils apprenticed to him among the most distinguished of whom were Major General Joseph Warren, Dr. Jeffries and Dr. Isaac Rand, Sr.

The fact that one was a physician exempted him from military service in the Revolution and when the British under Lord Howe occupied Boston he sought out Dr. Lloyd, who had been his physician when the latter was located at Castle Island and extended to him a good many courtesies that otherwise the military situation would not have permitted him to have done. Because of this friendship it was possible for Dr. Lloyd to secure co-öperation of the military authorities to enforce compulsory vaccination which doubtless prevented the spread of an epidemic of smallpox, introduced by the army of occupation. He was not wholly in sympathy with the revolutionary leaders, believing the time was not ripe for so radical a step but he

was a wholly loyal American. He was given, entirely without his solicitation or knowledge one of the first medical degrees awarded by the University of Cambridge (Harvard) in 1771 but declined the presidency of the Massachusetts Medical Society though strongly urged to accept it by his friends. On the recommendation of Dr. Morgan of Philadelphia, he was elected to honorary membership in the American Philosophical Society. He took time to cultivate a garden and was keenly interested in horticulture. His hospitality was free but not ostentatious and to his poor patients he was extremely liberal, having no desire to accumulate wealth. He was as regular an attendant at the services of Trinity Church as his professional engagements would permit. This brief account of the life of a physician in active practice, in troublous times, in Boston is an illustration of the type of physician which the training and discipline of Colonial days developed. From their conduct we have much to learn.

MISCELLANY

TUBERCULOSIS ABSTRACTS

A Review for Physicians

Issued by the National Tuberculosis Association

Light is a necessity to the life and well-being of the cell. Sunlight contains, in addition to heat and light, other forms of radiant energy. Heliotherapy was practiced by the ancients. Hippocrates used it in the temple of Aesculapius; Aristotle noted the effect of sunlight in producing green coloring in vegetable matter; Cicero describes the solaria which wealthy Roman citizens had constructed at their country villas; Celsus and Galen preached the salubrious effects of the sun. In 1779, Bertrand published his essay on "The Influence of Light on Living Organisms." In 1815, Loebel advised general, rather than local, insolation in cases of pulmonary tuberculosis, except in cases of hemoptysis. In the middle of the 18th century, Rickli established a clinic at Veldes, Austria, where patients were treated by insolation and fresh air with astonishing results. The discovery of the electric arc made artificial heliotherapy possible. Professor Finsen was the first scientist to practice actinotherapy by means of artificially produced rays and, in 1893, published his results of the treatment of tuberculosis (especially of the skin) by rays emitted from a carbon arc lamp, the "Finsen Light." In 1903, Rollier opened his first clinic for bone and joint diseases at Leysin, with brilliant results. The oldest of therapeutic agents has thus become one of the most modern.

HELIOTHERAPY

Although Rollier lays stress on the importance of his Alpine environment, it is possible to offer patients the advantage of heliotherapy almost anywhere. Certain conditions, such as clouds, inclement weather, high winds and moist atmosphere, must be met in low altitudes. To meet these contingencies, different forms of artificial light, such as the various forms of quartz-mercury and arc-lamps are used.

Rollier ascribes the beneficial therapeutic action of the sun's rays chiefly to the ultra-violet rays of the spectrum. He and his followers measure success in the individual case by the degree of the pigmentation of the skin. Although the sun's rays produce degrees of pigmentation which vary within wide limits according to the characteristics of the individual's skin, whether the benefits to be derived from light treatment in tuberculosis and other diseases stand in a definite relationship to the degree of pigmentation, is quite another matter. While pigmentation is an undeniable response of the body to treatment, it is perhaps not to be relied upon as an accurate gauge of the patient's progress toward recovery. For this, we must still look to the condition of the affected part itself, as revealed by careful examination and, in the case of bones and joints, to roentgen-ray appearance. Perhaps the alterations of the patient's blood-picture are the most reliable measure of the defense reaction. The quartz-mercury-vapor lamps produce ultra-violet rays in greater quantity than the sun itself, and in these lamps the heat or infra-red rays are almost entirely lacking. By the use of these lamps, on repeated exposure, an erythema may be obtained, which becomes continuous, and the skin becomes darker than before. It is spoken of frequently as pigmentation; but it is not the deep brown which the sun's rays produce in most skins. In patients who have acquired a deep tanning from exposure to the sun, it is not possible by means of the quartz lamp to prevent this pigmentation from fading away, nor is it possible in this manner to maintain the general improvement obtained from exposures to the sun. Ultra-violet rays alone are not a fair substitute for the rays of the sun in surgical tuberculosis.

The Sun Bath.

It is not possible to show, at present, that ultra-violet rays of artificial production have marked curative value in the treatment of tuberculosis of bones and joints. The action of the quartz lamp is superficial, and it is an unsatisfactory substitute for sunlight. The impression that the contrary is true as a result of which the more special orthopedic management of these cases is being omitted, is unfortunate and a calamity for many a patient.

The rejection of the quartz lamp as a satisfactory substitute for the sun is not to be accepted as a gesture of despair. Kisch, of Berlin, believes that the most important element of the solar light is to be found in the heat rays in the red and infra-red portions of the spectrum. He is convinced that their

activity stands in direct relationship to the surface temperature produced, and that this must approximate that which is produced by the sun itself. However, it does not seem justifiable to ascribe the virtues of sunlight altogether to either ultra-violet rays or to heat, nor is either an acceptable or practical substitute.

Heliotherapy may be a marvelous addition to our resources, but it works no miracles; it brings to our aid no biological resources of unprecedented character; it produces no new cartilage; it makes the process of cicatrization no less necessary than hitherto. At the same time, by its beneficial action, cicatrization is made more sure and rapid. The wise application of such a well-established surgical procedure as immobilization through fixation is just as important as ever. With all its limitations, heliotherapy is a great addition to our resources, particularly in the tuberculous bone diseases of children.—*Heliotherapy at Low Altitudes, A. H. Frieberg, Jour. of A. M. A.*, March 13, 1926, lxxxvi, 731.

TECHNIQUE OF THE SUN BATH

After preliminary hardening and observation, if the patient's condition warrants it, the sun bath is begun. This is given with the patient in the recumbent position and not sooner than one hour, or better, two hours after the meal, and should be discontinued at least one-half hour to one hour before the meal.

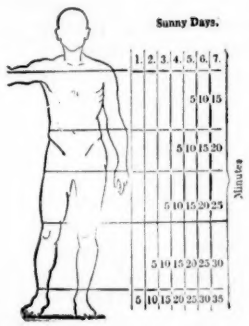
The first day, the feet are exposed for five minutes, then covered ten or fifteen minutes and another exposure for five minutes is given; covered again for ten, and exposed again for five. This is done front and back.

The second day, the feet are exposed for ten minutes and the knees for five; covered and uncovered three times front and back.

The third day, the feet are exposed fifteen minutes, the knees for ten minutes and the thighs for five; covered and uncovered three times, front and back.

The fourth day, five minutes' exposure is added to the feet, knees, and thighs, and the abdomen is given five minutes.

The fifth day, the previously exposed parts are given an additional five minutes' exposure and the chest is given five for the first time.



Diagrammatic Course of Sun Cure as Suggested by Rollier.

Each day, a five-minute increase is given until the whole body is able to tolerate three or four hours daily of sun cure without burning. The progressive exposure is carried on to ascertain the patient's tolerance and to obtain pigmentation without burning. If, for any reason, the sun cure has to be interrupted during the preliminary exposure, the time of the next bath should be reduced to an earlier stage, the stage depending on the degree of interference.

Great care should be taken during the early exposures to avoid burning and to watch at all times for unfavorable symptoms, such as a rapid pulse, rise of temperature, headache, nausea, fatigue, dizziness, or other constitutional disturbance, which might indicate an intolerance to the sun or an exacerbation of the disease.

The baths are always given the same way without regard to the location of the lesion. The lesions should be kept covered until the patient has been able to take one or two hours of cure without any reaction. When the lesion is exposed, it should be started at five minutes the first day, with five-minute increases each day thereafter.

In the case of feeble patients or of those who do not tan well, or in cases where there is considerable fever, it may be necessary to reduce the time of daily exposure and to give only two or three-minute increases daily. If any dermatitis or burning occurs, the treatment should be discontinued for two or three days. Sometimes, it is necessary to wait for a week or ten days.—*Heliotherapy in Tuberculosis, C. L. Hyde, M.D., Ohio State Med. Jour.*, Dec. 1, 1925.

"A child with a tuberculous hip might be made a chronic invalid if light alone is given; whereas, if he is placed in proper orthopedic rest, with good food, fresh air and proper light treatment, usually he can be cured, sometimes with full function of the joint restored."

HOSPITAL AND MEDICAL WORK OF THE PUBLIC HEALTH SERVICE

The U. S. Public Health Service was originally established as the Marine Hospital Service more than a century and a quarter ago, for the purpose of providing medical relief to sick and disabled merchant seamen. This interesting fact was recently mentioned by Surgeon General H. S. Cumming, who stated that when the Fifth Congress, Second Session, enacted the law approved on July 16, 1798, by President Adams, creating the marine hospitals and other medical relief stations for seamen from American merchant vessels, a sickness and accident insurance, of a sort, was established for a particular industry,—the first of its kind in the new world. There was evidenced, moreover, the purpose and intent of the Congress to relieve American vessels of a responsibility and expense which, by ancient maritime law and custom, otherwise rests with the ship. Finally, there was the provision, necessary then as now, to care for a class of sick and disabled, often remote from their homes, in places where they might otherwise constitute a community burden and a health hazard. Between 1798 and 1884 the sailors themselves contributed as the law required, at first 20 cents, and, after 1870, 40 cents per month.

Since 1884 the sailor has been relieved of direct contribution for the maintenance of medical relief furnished by the U. S. Public Health Service, the expense of which was at that time shifted to the tonnage tax imposed by a law enacted in 1884, upon American and foreign ships. Although this tonnage tax has, since 1906, been devoted to the general income of the Government instead of to the specific purpose for which it was originally designed, it still constitutes an important source of revenue.

The beneficiaries of the U. S. Public Health Service include many different classes. Some are entitled only to physical examination or vaccination and others to hospital and out-patient treatment. Certain beneficiaries are treated free, whereas others are pay patients. Some patients are admitted to treatment only upon the request of another Government Department, while others need but to identify themselves. A patient may have a double status as a beneficiary, for instance, a veteran of the World War employed as a seaman or as a lighthouse keeper and disabled as a result of his vocation.

American merchant vessels—not the fighting ships of the Navy, but the craft owned chiefly by private citizens—that carry passengers and freight across the oceans, up and down the coasts, and on our inland lakes and rivers, send their sick and disabled seamen to the marine hospitals and other relief stations of the Public Health Service. Occasionally, however, a man locally reputed to be a sailor is denied these medical benefits and an inquiry is received as to the reasons therefor. Frequently, the answer is that the claimant had abandoned his vocation as a seaman more than the conventional two months previously. It is perplexing to the average citizen to see a member of the civilian crew of any Army transport taken to a marine hospital when a military ambulance is receiving an officer or an enlisted man from the same vessel for the Army hospital, while perhaps from the same dock a battleship or a submarine is sending a disabled bluejacket to the naval hospital. It may also seem paradoxical that a United States marine goes, when sick, to the naval hospital instead of to a marine hospital, and that a disabled Coast Guard man whether from ice or seal patrol, life-saving station, or rum chaser, goes to the marine hospital perhaps along with injured members of the crew of a rum runner, if the latter is (as rarely happens) an American documented vessel.

Temporary hospital care only is contemplated according to the language of the original act. The aged and chronically infirm, suitable for domiciliary care, but not in need of hospital treatment, are not usually considered admittable to hospital, and neither are those with minor disabilities who can be treated as out-patients. These restrictions do not apply to lepers under treatment at the National Leprosarium, Carville, La., who also receive clothing, tobacco, etc., and, when cured, may be transported to their homes, perquisites denied to all other classes of patients. There are three classes of beneficiaries, namely, Coast Guard, Coast and Geodetic Survey, and the Lighthouse Service, who may be treated at the expense of the Public Health Service, even in places where no formal arrangements exist. One class only, the Coast Guard, may be thus treated in foreign ports. Other American seamen in foreign ports, when sick or injured, are cared for at the expense of their vessels, but, signed off from the vessels and becoming destitute, they are charges of the State Department and may be repatriated by an American consul.—*United States Public Health Service.*

THE AWARD OF THE LESLIE DANA MEDAL

St. Louis, Mo., Oct. 18—Dr. Park Lewis, of Buffalo, N. Y., vice president of the National Society for the Prevention of Blindness, was presented with the Leslie Dana Medal here tonight "for the most outstanding achievements in the prevention of blindness and the conservation of vision" in America. The medal is given through the Missouri Association for the Blind, of which Mr. Leslie Dana is a director, and it is one of the most highly prized marks of recognition in the entire public health field.

The medal was presented to Dr. Lewis, on behalf of the donor, by Dr. Edward Jackson of Denver, Colo., editor of the *American Journal of Ophthalmology* and dean of the profession in America, who was the first recipient of the award in 1925. The inscription on the medal reads: "To Dr. Park Lewis, physician, scholar, humanitarian—for life long devotion to the prevention of blindness, 1928."

Speaking on the birth and development of the movement for the prevention of blindness and the conservation of vision, Lewis H. Carris, of New York City, managing director of the National Society for the Prevention of Blindness, declared that "although the movement would have started some day without the impetus of Dr. Lewis, it would have been delayed precious years and probably would have made slower progress in the beginning without him."

"Dr. Lewis has been a practicing ophthalmologist in Buffalo for 50 years and has done much in that time to alleviate the suffering of individuals afflicted with various diseases and injuries of the eyes," said Mr. Carris. "All of this—great as it may seem—is of lesser importance than the far reaching effect of his efforts in the field of prevention of blindness.

"This is an age of preventive medicine, and Dr. Lewis was a pioneer in this direction. Being an ophthalmologist, naturally, he was most concerned with the prevention of blindness. Already he has seen within his own lifetime what medical research and public education can accomplish. We all know that a good start has been made; that we are heading gradually toward the time when the size of the blind population will be greatly reduced. There are about 100,000 blind persons in the United States today and this is only a fraction of the total blind population of the world.

"Dr. Lewis was one of the three persons who established the New York State Committee for the Prevention of Blindness in 1908 which developed later into the present National Society for the Prevention of Blindness. In 1902 he stressed the need for a study of the causes of blindness until the Governor of New York appointed him chairman of a commission to engage in this study; and in 1905 he was appointed chairman of a second commission with an appropriation of $10,000 to make a further study of these causes and also to study means of preventing blindness. Three years later the New York State Committee for the Prevention of Blindness was formed. This was the beginning.

"The National Society for the Prevention of Blindness was unusually fortunate in having for one of its principal sponsors a man like Dr. Lewis who was able to contribute authoritative knowledge as a leading ophthalmologist, and willing to contribute on the other hand as an idealist and humanitarian. His devotion to the Society has brought him down from Buffalo to New York City for almost every one of the frequent executive committee meetings, probably at great personal loss through absence from his office. In the early days, when the financial problem was acute, Dr. Lewis often took care of matters by reaching into his own pocket.

"One of the first objects of the Society was the reduction of the frequency of blindness from

ophthalmia neonatorum, commonly known as 'babies' sore eyes.' This has been accomplished to a marked degree already. The enrollment of children in schools for the blind now discloses that blindness from this cause has been reduced by 64 per cent. since 1908 when various states first began to make it compulsory for physicians and nurses to use prophylactic drops in the eyes of babies at birth.

"The efforts of the Society have extended in other directions, notably in the fields of sight-saving classes for school children with seriously defective vision, eye clinics for preschool age children, research on the subject of trachoma, and industrial eye hazards. Something has been achieved in each of these directions; yet much more remains to be done.

"Although Dr. Hideyo Noguchi, who died recently, discovered some important things concerning trachoma, which is perhaps the greatest worldwide cause of blindness, a great deal more needs to be learned about this cause of blindness. The Japanese scientist of the Rockefeller Foundation made a start, but the job is unfinished.

"There are only 300 sight-saving classes in the United States, despite the fact that 5,000 should be provided to conserve the sight of all boys and girls in our schools who need special books, special lighting and special instruction.

"In the field of industrial eye accidents, new machine guards are constantly being installed and workmen are gradually being taught habits of carefulness, but the ever growing complexity of modern industry creates new hazards."—*Bulletin of the National Society for the Prevention of Blindness.*

ANOTHER GAMBLER WITH HUMAN LIFE LOSES

Dr. John J. Donoghue of 10 Vernon Street, Worcester, has been convicted by a jury in the Superior Criminal Court of an alleged illegal operation which was supposed to have caused the death of a Worcester woman. This man's registration was revoked by the State board more than a year ago.

He has been given a jail sentence.

EIGHT LEPERS RELEASED AS APPARENTLY CURED

The Public Health Service has recently authorized the probational release of eight lepers from the National Leprosarium at Carville, La., as no longer a menace to the public health. These eight lepers have been under treatment at the National Leper Home for varying lengths of time, ranging from two years to seven years. It is of interest to know that leprosy, the dread disease of the centuries, is beginning to be conquered by improved modern scientific medical treatment.

The National Leprosarium at Carville, La., has been operated by the U. S. Public Health Service for a little more than seven years. During that time 37 lepers have been released or paroled as being no longer dangerous to the public health. Only one of these lepers has suffered a relapse and has had to resume treatment. More than 300 lepers are now under treatment at this institution.—*Bulletin United States Public Health Service.*

APPOINTMENT OF CONSULTING LIBRARIAN OF THE JOHNS HOPKINS HOSPITAL

Lieutenant Col. Fielding H. Garrison, head of the United States Army Medical Corps Library at Washington, has been appointed as consulting librarian of the Welch Medical Library of the Johns Hopkins Hospital which will be opened soon.

Col. Garrison is a native of Washington and graduated from the Johns Hopkins University in 1890 and received the degree of M.D. three years later from Georgetown University.

He has been editor and associate editor of the Index Medicus and the Quarterly Cumulative Index Medicus. He was commissioned a major in the Medical Corps of the Army in 1917.

The appointment of Lieutenant Col. Garrison brings to the Welch Memorial Library an assurance of distinction and authority because he is recognized as an indefatigable student of medical bibliography.

Baltimore has acquired an institution that will add to its reputation as one of the medical centers of the world.

William G. Shules will be assistant librarian at the Welch Library giving part time service.

APPOINTMENTS TO PUBLIC HEALTH SERVICE

Surgeon General Cumming has announced the appointment of Dr. Claude S. Hudson to be chief of the Division of Chemistry of the Hygienic Laboratory of the U. S. P. H. service.

Dr. Hudson has been given the position as professor of chemistry.

Dr. Hudson graduated from Princeton University with the degree of Doctor of Philosophy in 1927. He has been connected with the teaching faculty of the Massachusetts Institute of Technology and other institutions. He is regarded as a carbohydrate expert.

CONFIRMATION OF THE IMPORTANCE OF THE COMMON COLD

The New Haven, Connecticut, Department of Health has ascertained that the seven thousand children in the public schools of that city lost forty thousand school days in 1927 because of colds.

DEFECTIVE HEARING IN SCHOOL CHILDREN

About three million school children of the United States have measural defects of hearing according to reports of the joint committee on Health Problems in Education.

This committee has recommended a uniform law in all states requiring an annual examination of the hearing apparatus of children as a part of the annual health examination and also the development of clinics for the treatment of those whose hearing is defective.

MEDICAL PROFESSION OF WESTERN HEMISPHERE TO CONGRESS IN HAVANA

The next congress of the Pan-American Medical Association will be held in Havana, Cuba, from December 29, 1928 to January 3, 1929. The program which is being arranged by the President, Dr. Fred H. Albee of New York City, will be a strong one, and will include four orations, upon the subjects of surgery, medicine, pediatrics, and tropical medicine.

Dr. William J. Mayo will give the Oration on Surgery, and Dr. Lewellys Barker of Johns Hopkins University the Oration on Medicine. Papers will be read in both Spanish and English.

This congress will be representative of the medical profession of the entire Western Hemisphere. Chapters of the Association have been and are being organized in various centers of North America and Central America, as well as in the Antilles, all of which will be represented at the congress.

One of the recent accomplishments of the Pan-American Medical Association is the establishment of the Pan-American Hospital in New York City for the benefit of the Latin-speaking people.

A large attendance is solicited.

RECORD

The infant mortality rate last year was the lowest on record, according to a statement made public on September 24 by the Children's Bureau of the Department of Labor.

Deaths of infants under 1 year of age per 1,000 live births in the birth registration area were, it is stated, 64 in 1927 as against 73 in the preceding year.

The report, which was prepared under the direction of Dr. Blanche M. Haines, director of the maternity and infant hygiene division of the Bureau, indicates a great increase in the various activities of the State.—*U. S. Daily.*

CORRESPONDENCE

CHILD LABOR AND PREVENTIVE MEDICINE

City of Boston
Health Department
City Hall Annex

15 Grosvenor Road,
Jamaica Plain,
Boston, Mass.
November 7, 1928.

Editor, NEW ENGLAND JOURNAL OF MEDICINE.
Boston, Mass.

Dear Sir:

The writer is venturing to address the JOURNAL because he feels sorry to see it base an editorial policy on such surmises as find expression in the article in the JOURNAL of Nov. 1, 1928, entitled "Child Labor and Preventive Medicine".

The good faith of the author of that article is not questioned. It is highly probable that she has not had the opportunities which the writer has had to note the ways in which the supposed needs of the young have been capitalized to provide agreeable vocations for adults.

The JOURNAL article recalls to the writer especially a study made by him of the conditions of employment of boys from fourteen to sixteen years of age in the cotton mills of this State.

A considerable proportion of the boys in the industry were subjected to a physical examination and the results tabulated. A report of the investigation was published by the United States Public Health Service as *Public Health Bulletin* No. 78. Many of the boys were found to be in an unsatisfactory physical condition. Their condition was not ascribed entirely to their employment. In most instances causes in the home were easy to discover. It was allowed to appear also that there were many other boys of the same age engaged in the same work for even longer periods who were in a physical condition regarding which no fault could be found. For these reasons there has been little demand for this report and copies are doubtless still available.

Perhaps the most striking feature brought out by these physical examinations was their disclosure of the extent to which faulty development from congenital causes was accountable for an unsatisfactory physical condition even when nutrition was evidently involved. Some were "lop-sided", but not from work. Physical asymmetery is characteristic of congenital defectiveness; "bad posture" is indicative of a defective nervous organization.

This study completely upset the writer's pre-conceived ideas regarding the employment of minors in "cotton mills" and was one of a succession of personal experiences which have convinced him that in the real interest of both children and parents there is no current health propaganda which has greater need of being purged of misconception and "bunk" than professional "child welfare".

The picture of a woman now ninety years old in excellent physical condition, a mother of six children of unusual physical and mental vigor, who tells the writer that when she was thirteen years old she ran more looms in a cotton mill than were usually assigned to an adult, does not blind the writer to the possibility of injury to a weaker child by similar work. Neither does the fact that the superintendent of what was perhaps the most prosperous cotton mill in this State the past year went to work in a mill when he was eleven years old.

It is also to be taken for granted that a mentally and physically normal girl thirteen years old might attend to intermittent work like keeping looms running properly for ten hours a day, whereas the operation of a machine requiring constant attention would be highly inadvisable.

This matter however tends to take care of itself in industry. Notwithstanding misleading statistics for propaganda purposes the number of minors employed today at work injurious to them in this country is insignificant. If for no other reason they are eliminated from modern highly competitive industries because the employment of persons physically or mentally unfitted for a job is unprofitable.

What we find in industry as in the War draft are individuals, minors and adults, who are congenital defectives, physically, and of necessity mentally handicapped as well. They are more conspicuous in the lower paid industries. Competition brings them there. The remedy is not restriction of the employment of the normal. Employment in such work as normal boys usually find, between the ages of fourteen and sixteen, is better for their health than confinement in school. If a boy does not develop industrious habits before he is sixteen years old, either at work or in school, there is little chance of his ever becoming a really useful member of society. Our young criminals are not boys who have been kept busy between the ages of fourteen and eighteen.

We will have defectives in industry and we will find them more conspicuous in the lower paid jobs, until we are able to prevent the birth of the congenitally defective. This is a matter of eugenics. Apparently normal animals or human beings may have a defective offspring, but a normal progeny cannot be produced from physically defective stock.

So long as we have defectives they will, of course, present their own special problems. More can undoubtedly be done to safeguard the health of both the normal and defective not only in their places of employment, but what is of more importance today, in their homes and places of recreation.

Obscure causes of ill health in workers is usually to be found in the home, perhaps even the reason for chronic carbon monoxide poisoning. Human defectives themselves are the product of the home, not of the workshop.

So far as industry is concerned, experience indicates that a judicious application of the principle of employers' liability offers the best means of securing protection to health.

We should not, however, be confused by needs of this character and allow ourselves to be deceived by the practice of exhibiting manifestations of congenital abnormalities as the effects of manual labor and endorse as a remedy the restriction of opportunities for employment for young persons at work which normal boys and girls can do with physical, moral and financial benefit to themselves and to the economic benefit of their community.

VICTOR SAFFORD.

RECENT DEATHS

CLARK—DR. EDWARD JAMES CLARK, for 17 years superintendent of the Lowell Corporation Hospital, died at his home in Lowell, after a long illness, November 4, 1928, at the age of 49.

He was born July 11, 1879, was a graduate of Dartmouth Medical School in the class of 1901 and settled in Lowell in that year, joining the Massachusetts Medical Society. In 1911 he was made superintendent of the Lowell Corporation Hospital, a position he resigned last June because of ill health. Dr. Clark was a member of the New England X-Ray Society and of the American College of Surgeons.

WALKER—The death has been reported of DR. GERTRUDE A. WALKER, a former practitioner of Malden and Boston, in New York on October 28, 1928, at the age of 65. She was a graduate of the Woman's Medical College of Pennsylvania, in 1892, and a daughter of Dr. George W. Walker, a practitioner of Malden. Dr. Gertrude Walker was the author of a text-book on diseases of the eye and "Songs and Games for Little Ones."

NEWS ITEM

HARVARD MEDICAL SCHOOL NEWS

On November 1, 1928, Dr. Edward Francis of the United States Public Health Service spoke in Amphitheatre E of the Harvard Medical School, discussing the more technical aspects of the Tularemia problem. Dr. George H. Bigelow, Commissioner of Public Health, who introduced the speaker, told of a meeting of the health boards of all the New England States and New York where new legislation to combat the spread of tularemia to hitherto untouched areas was urged.

Dr. Francis in his interesting discussion stated that so far 667 cases have been reported in the United States, though there are undoubtedly more cases unrecognized. Of these there were 24 deaths. Cases have been reported in every state except those in New England. Tennessee with 40 cases has reported the greatest number.

The disease was officially discovered in 1910 by McCoy in California. Now that the disease is becoming better known, physicians are reporting a similar condition in patients as far back as 1904; the diagnostic feature of the disease gives positive agglutination reactions in the serum.

Tularemia appears in two forms. In the acute form an ulcer appears at the point of infection and soon the lymph glands draining that area are greatly enlarged. These glands may break down and suppurate. In the subacute type the affection resembles an irregular typhoid case. Fever is usually high in the beginning (104°) drops in three days, and after a secondary rise makes a slow drop by lysis. In primary infection of the eyes papules appear on the conjunctiva; these all usually clear, though there is one case of corneal ulcer, perforation, and resulting blindness.

Transmission of this disease is either by the same tick which carries the organism of Rocky Mountain Spotted Fever (*Dermacentor Andersoni*), or by the deer fly (*Chrysops discalis*). The disease in rabbits is a septicemia with the resulting inoculation of any insect which bites the rabbit. The infectious agent may be transmitted by the parent ticks to eggs, nymphs, and larvae.

In the laboratory several curious things are noticed. Animals vary greatly in their susceptibility to the bacterium tularense. Foxes and dogs are not susceptible while coyotes are highly so. Similar variations occur in every class of animals. In animals which die from this disease the findings are focal necroses in the lungs, liver, and spleen with lymph node changes quite similar to tuberculosis. The bacterium itself changes from a coccoidal to a bacillary form in 24 hours on blood agar. If this is allowed to stand for three months, the bacteria again assume a coccoidal form. On fluid media a bipolar form is found. Cystin seems to be necessary for growth. Serologically there is a cross-agglutination with B. Abortus and B. Melitense to an equal degree.

No effective treatment for this disease has been found, though everything has been tried. It appears impossible to make vaccines in the usual way. Dr. Francis thinks that human vaccines could be made though this has not been tried. Infection gives immunity for all time. The preventive measures are of the utmost importance. A quarantine of ten days on imported live rabbits, and the keeping of dead rabbits in cold storage for thirty days before selling is essential. The relaxing of game laws so that all rabbits east of the Mississippi River may be killed was suggested as a possible preventive measure against its spread. With a disease of such apparent unimportance and the lack of public interest it is doubtful if any legislative action to prevent its spread will be effected.

NOTICES

DR. EDWARD L. TWOMBLY has returned from abroad and will resume his practice at 416 Marlborough Street.

REMOVALS

Eli Friedman, M.D., announces the removal of his office to 311 Commonwealth Avenue, Boston, on October 1, 1928.

Bernard Appel, M.D., announces the removal of his office to 311 Commonwealth Avenue, near Massachusetts Avenue, Boston, Mass.

Dr. A. I. Shain has moved his office from 636 Beacon Street, Boston, to 491 Commonwealth Avenue, Boston.

REPORTS AND NOTICES OF MEETINGS

NORFOLK DISTRICT MEDICAL SOCIETY

The Norfolk District Medical Society has for several years held some of its monthly meetings at the various hospitals situated in the district. Following this custom, which has proved most helpful in acquainting the members with the splendid work which is being done in these institutions, both public and private, the first meeting of this season was held at the Pondville Hospital, October 30th.

Dr. Lyman A. Jones, Superintendent, and Dr. George H. Bigelow Commissioner of Public Health, welcomed the members to this newest State Hospital. There was opportunity to visit the wards, under the guidance of the visiting staff and also the quarters used in the large and increasingly important out-patient clinic, the operating rooms and the department of radiation. After these visits and a very short business meeting, there followed an exceedingly interesting program consisting of a series of informal talks by members of the staff. Dr. E. M. Deland, Chief of Staff, outlined the general plan followed in admission and treatment of patients. In this, the seventeenth month of the hospital's existence, the beds are all filled and there is a short waiting list. A review of the first year showed that a number of men and the number of women treated were approximately equal. The number of autopsies was exactly 50% of the number of deaths. The indispensable aid of the social worker attached to the hospital was emphasized. No deodorants are used in the wards. The desired ends are accomplished by frequent changing of dressings and scrupulous cleanliness. That this method is sufficient is shown by the fact that the executives of a hospital in another state, after the return of their representatives from a visit to Pondville, wrote to the Superintendent for information about the very powerful and effective deodorant used!

Dr. Gerber spoke briefly of the uses of X-rays and radium. He emphasized the use of X-rays for diagnostic purposes, particularly as a guide to the surgeon before operating, to see whether or not metastasis had already taken place. The out-patient clinic not only makes diagnoses but gives radium and X-ray treatment in suitable cases. As would be expected, the number of treatments by radiation is many times as great as the number of operations. Dr. J. V. Meigs discussed diagnosis and treatment in gynecological cases and Dr. Henry Jackson, Jr., spoke of some of the pitfalls of diagnosis in patients suffering from the lymphomata and leukemias. Dr. A. M. Greenwood discussed some of the pre-cancerour lesions, such as warts, moles, keratoses, and the approved methods of their treatment. Dr. Grantley Taylor was the last speaker on the general subject of surgical treatment of cancer, with special discussion of the use of the electric "knife" in operations on vascular tumors. Fortunately the hospital is provided with the greatly improved equipment, only recently made available, for this kind of work.

This hospital, its establishment and the significance of its availability to the citizens of Massachusetts have been described in the columns of this JOURNAL, but a personal visit gives one an appreciation of its far reaching value and a confidence in its personnel that can come in no other way.

ESSEX NORTH DISTRICT MEDICAL SOCIETY

The 87th quarterly meeting was held Wednesday, Oct. 16, at Essex Sanatorium, Middleton, upon invitation of the Trustees and Olin M. Pettingill, M.D., Superintendent. It took the form of the annual joint get-together of the four District Societies, Middlesex North and East and Essex South and North. These combined meetings are held as a part of the statewide plan of joint meetings of District Societies, originally recommended and practiced during the administration of former President Dr. Alfred Worcester.

Dr. D. T. Buzzell, senior President of the four societies, was in the chair.

During the clinical showing of tuberculosis cases, Dr. Pettingill accentuated two problems which confront his staff. The first is as to the disposal of adult stationary cases with limited means which are capable of half-time work, but on full time employment would relapse. The choice lies among these conditions: A continuance of life in the Sanatorium, a carefully guarded part-time employment, or a transfer to some institutional home.

A second problem is the simultaneous existence of tuberculosis and pregnancy. In the personal experience of the Superintendent all cases, excepting one, of this combination have been injurious to the lung condition of the patient. The interruption of the pregnancy at about five or six months seems to offer the seriously sick tuberculous patient her best opportunity. At present there is said to be no extensive figures extant on this class of cases, but the obstetricians and sanatorium men are making an attempt to collect statistics. Before it was possible to make so definite a diagnosis of tuberculosis, a certain number of cases have done well when the condition complicating the pregnancy only simulated tuberculosis. These classes of cases will receive further study.

In the wards a series of cases were demonstrated by the medical staff, showing cavity formation, succussion and other specific phenomena of tuberculosis.

The moving picture reels showed the ideal method of handling a lung case for diagnosis.

At 4 P. M. Edwin W. Bullock, M.D., of Somerville, from the Medical Department of the New England Telephone and Telegraph Co., gave an interesting talk and demonstration upon Resuscitation from Electric Shock, Inhalation of Illuminating Gas and Submersion in Water. He used the living subject and was assisted by Mr. Gilson from the Beverly Gas and Electric Co.

The high points in the above address can be summarized as follows:

1. Begin to work on the victim of the accident without a moment's delay and on the spot.

2. Keep the patient in the open, where the air is purest until breathing is established, sending for assistance and removing the patient to home or hospital as a secondary consideration.

3. The use of the prone method, to the exclusion of mechanical apparatus, was advised. Persistence in the above method as long as there is any warmth remaining or any color under the nails, was recommended. Let the period of work be measured in hours rather than minutes.

4. For use in gas cases and others needing an extra supply of oxygen there is used a cabinet consisting of two tanks whose outlets are joined by a

Y shaped connection, and a supply of oxygen with a 5% mixture of carbon dioxide is given the patient through an inhaler.

Experience has shown that low voltages, as 500, are apt to be more serious than those in the thousands.

The prone method is helpful in cases of those overcome by smoke.

Dr. James S. Stone of Boston spoke interestingly concerning the activities of the State Society.

He described the work of the recently formed Committee to Study the Workmen's Compensation Act and allied subjects. Among the objects which this committee desires to accomplish as additions to the practical workings of the Act are that hospitals shall be paid a cost rate for the care of such patients and that the family physician or the physician in charge of the case in the hospital shall receive the customary professional fee. These are matters of simple justice and will undoubtedly be arranged.

Dr. Stone mentioned that the Society will try to have enacted the bill bringing private school pupils under the same law as those from public schools, with respect to the requirement of vaccination. Dr. S. B. Woodward's bill is an ideal one aiming to accomplish this purpose.

Two years ago it became necessary to demonstrate to our state legislature the unwisdom of constituting a separate board for chiropractors. It will be again our duty to repeat the performance if a similar bill is presented this year. The American Medical Association's Council on Medical Education and Hospitals has reported a great reduction in the number of individuals who attend these schools. This is but a repetition of the history of all cults which attach themselves as appendages to legitimate medicine and which tends to their extinction.

The principle of one standard for the examination of all applicants who desire to practice medicine in Massachusetts is the best hope for the sick and well people of the state.

Dr. Stone spoke encouragingly of the project for a building of our own as a home for the Society's activities and suggested that each Fellow contribute such a sum as he can give toward this project.

During the whole meeting lively and instructive discussions occurred.

At 6 P. M. an excellent supper was served.

J. Forrest Burnham, *Reporter.*

THE HARVARD MEDICAL SOCIETY

The first meeting of the Harvard Medical Society for the year 1928-29 was held in the Peter Bent Brigham Hospital amphitheatre at 8:15 o'clock on Oct. 23, 1928. Dr. Wm. P. Murphy, the secretary of the society, presided. After a presentation of cases three talks on brain disease and especially on hypophysical disturbances were given.

The first case was presented by Dr. Harbin of the surgical service. The patient was a 66 year old retired laborer who was admitted on Oct. 21, 1928, with a chief complaint of sharp stabbing pain in the left upper quadrant of his abdomen. His past history was negative except for influenza in 1918 of ten days' duration. His present illness began on Saturday night at 8:00 o'clock when he was awakened by a sharp pain in the left upper quadrant. He coughed once or twice, became nauseated, and vomited a greenish watery fluid. Coughing and deep inspiration exaggerated his pain. Two more similar attacks occurred during the night and the next morning he came to the hospital on the advice of his physician.

On entry he appeared very sick with a temperature of 102°, pulse 100, and respirations 45. Vocal fremitus was markedly increased over the entire chest, but mostly at the bases. The left side was hyperresonant with some dullness. Numerous musical and crepitant râles were heard throughout the chest, and his heart could not be percussed. His entire abdomen was spastic with rigidity and tenderness over the upper left quadrant. A questionable mass was felt there.

He was given 1500 cc. salt solution by hypodermoclysis and that afternoon he was better. His chest was clearer, but the abdominal pain remained. Monday he was better and was allowed a soft diet. X-ray showed heart and trachea pushed to the right, cloudiness at the left base, and some indistinct signs of massive atelectasis at the right base. The white count continued high (28,000); the urine was negative. He was given more fluid and appeared better. When presented, his chest was practically clear, his pulse normal, temperature 100°, and his respirations 25. He was very much improved.

The second, a medical case, was presented by Dr. Tropoli. The patient was a 71 year old real estate operator who had entered the hospital for the first time on Nov. 1, 1926, complaining of cough, fever and chills. Physical examination showed generalized arteriosclerosis, enlarged liver, glands in the axilla and inguinal region, and an area of consolidation in the upper posterior surface of the right lower lobe. His white count was 40,000 with 60% lymphocytes which continued to range from 40-86% of the differential. He was discharged the middle of December well, and came back in January with symptoms of dysuria, urgency, and frequency. This time he showed an enlarged firm nodular prostate but the X-ray showed no lung metastases. After X-ray treatment he improved.

He came in ten days ago with a cold, malaise, cough and pain in the right upper lung. Examination showed many moist crackles in the right lower lobe, enlarged glands in the inguinal region, and an enlarged liver. He had a right lower lobe pneumonia which finally cleared. His white count continued high with 62% lymphocytes, mostly simple ones and some degenerated forms. The question of chronic lymphoid leukemia was raised.

"Illustrations of Brain Disease from the Great Morbid Anatomists" was given by Sir Charles Ballance, consulting surgeon to St. Thomas' Hospital, and to the National Hospital in London. He showed colored lantern slides of drawings taken from the books of early pathologic anatomists, explaining each and drawing interesting observations from the lesions illustrated.

Dr. Harvey Cushing next spoke on "Hypophyseal Growth Principles." He showed three patients illustrating in turn hyperpituitarism, acromegaly, and hypopituitarism. The excess of the principle of the secretion may perhaps be caused by a tumor or hypertrophy; the insufficiency may be caused by a tumor pressing on the pituitary gland or by its atrophy. The growth principle affects the viscera of the body as well as the bones.

The last paper was presented by Dr. Tracy Putnam who discussed "Experimental Acromegaly." Dr. Putnam has been continuing Dr. Evans' work. Rats were used in the beginning because they are very resist-

ant to infection. The chief difficulty was to sterilize Dr. Evans' emulsion; Dr. Putnam finally accomplished this by a method of filtration.

Two female bulldogs of the same litter bred from prize-winners on both sides were raised up to ten weeks in a similar manner. Then injections of 5 cc. of the emulsion were begun in one dog, which were increased so that at the end 75 cc. were being given intraperitoneally. The injected animal gained steadily. At the end of a year the injected animal was very weak with flabby muscles, lax skin, and pendulous abdomen. The nipples were markedly enlarged and the vagina had prolapsed. The dog had an enormous appetite, drank huge quantities of water, and sweat profusely. It died one hot day of pulmonary edema.

Autopsy showed scarcely any fat in the injected animal. There was no fluid in the serous cavities to account for the increase in weight. All the internal organs were enlarged, especially the genital tract. The heart was twice as heavy as that of the control animal, the pancreas larger, gelatinous, and red, and the liver very large. All the bones were larger and heavier with much osteophytic formation. The skull was enlarged and the canine teeth asymmetrical. Histologically, the liver showed some central necrosis; the adrenals showed microscopic adenomata; the thyroid contained no colloid with the acini lined by high columnar epithelium; and the ovaries showed normal ripe ova, but the follicles had not ruptured.

Following his talk Dr. Putnam demonstrated the autopsy material.

The meeting was interesting and well attended.

THE ANNUAL MEETING OF THE MASSACHUSETTS PSYCHIATRIC SOCIETY

The annual meeting of the Massachusetts Psychiatric Society was held at the Hotel Statler October 19th. The following officers were elected for the ensuing year:

Douglas A. Thom, M.D., President.
L. Vernon Briggs, M.D., Vice-President.
Winfred Overholser, M.D., Secretary and Treasurer.
E. Stanley Abbott, M.D., Councillor.
James V. May, M.D., Councillor.

The speaker of the evening was Dr. Frederick W. Parsons, Commissioner of Mental Hygiene of the State of New York, who gave a very interesting description of the problems and plans of that State in connection with the care of the mentally ill.

WINFRED OVERHOLSER, *Secretary.*

THE NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

Guided by the fact that "most blindness is preventable," all of the principal forces now engaged in the work of preventing blindness and conserving vision throughout the United States will gather in New York City for a three day series of conferences, Nov. 26-28, to learn from the leading authorities of America the latest developments in the study of the chief causes of blindness. This exchange of experiences and discussion will be held under auspices of the National Society for the Prevention of Blindness in the Russell Sage Foundation Building, 130 East 22nd Street. Industrial physicians, ophthalmologists, public health nurses, sight-saving class supervisors and others will participate in the conferences which will be held in connection with the 14th annual meeting of the Society.

There will be a joint session of the American Association of Industrial Physicians and Surgeons and the National Society for the Prevention of Blindness the first day, November 26, and a joint session of the Society and the National Organization of Public Health Nursing the next day. Many of the 300 sight-saving class teachers and supervisors in the United States are expected to be present at another joint meeting with the Society. Explaining the reason for the nationwide conference, Lewis H. Carris, Managing Director of the Society, said:

"Not only are most cases of blindness preventable, but we believe that a day is not far distant when some of the principal causes of blindness will be eradicated. This good news to mankind is not merely the echo of our hopes, but is based on the progress already made in combating blindness in organized form during the last 20 years and the various research projects which are under way at present. The annual meeting of the National Society for the Prevention of Blindness the last week in November of this year will serve as a means of recapitulation of the accomplishments in every direction of the movement for the conservation of vision and will give a broader outlook to the various workers in specialized fields of this movement.

"There are approximately 100,000 blind persons in the United States today and the majority of them lost their sight needlessly. We expect the amount of blindness in the United States to be materially reduced within the next generation. This is an age of preventive medicine and one of the most striking instances of the benefit of a preventive program is that of ophthalmia neonatorum, commonly known as 'babies' sore eyes.' The use of prophylactic drops in the eyes of babies at birth is now required by law in most of the states. As a result, the number of students now entering schools for the blind who have lost their sight from this single cause is 64 per cent. less than it was 20 years ago when the use of these drops was not compulsory."—*Bulletin The National Society for the Prevention of Blindness*, 370 Seventh Avenue, New York City.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

The next meeting of the New England Ophthalmological Society will be held at the Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston, on Tuesday evening, November 20, 1928, at eight o'clock.

Clinical cases will be shown at 7.45 p. m. Members are requested to be present at this time to see the cases.

Report on Clinical Cases:

A Case of Bilateral Uveitis. Dr. J. Herbert Waite.

Questionable Case of Tubercle of the Macula. Dr. W. Holbrook Lowell.

Paralysis of External Recti. Dr. Benjamin Sachs.

Use of Contact Glass in Cases of Kerato-Conus. Dr. George S. Derby.

Several Microscopical Slides of Interesting Cases. Dr. T. L. Terry.

Papers:

Do Corneal Scars Move? A Preliminary Report of Clinical and Biochemical Study. Dr. Ben Witt Key of New York. Discussion: Dr. Frederic Verhoeff.

Measured Correction of Squint by Combined Tech-

nique (if time permits). Dr. W. Holbrook Lowell. Discussion: Dr. Greenwood and Dr. Lancaster.

Members reporting cases or reading papers are expected to have an abstract with them to hand to the Secretary.

SAMUEL H. WILKINS, M.D., *Secretary.*

BOSTON MEDICAL HISTORY CLUB

The next meeting will be held at the Boston Medical Library, 8 The Fenway, Monday, November 19, 1928, at 8.15 P. M.

Jenner's Home at Berkeley. Illustrated with lantern slides. Henry R. Viets, M.D.

The History of Diphtheria. Arthur B. Lyon, M.D.

EDWARD W. TAYLOR, M.D., *President.*
JAMES F. BALLARD, *Secretary.*

SOUTH END NEIGHBORHOOD MEDICAL CLUB

The next regular meeting of the South End Neighborhood Medical Club will be held at 554 Columbus Avenue, Boston, on Tuesday, November 20, 1928, at 12 noon.

The speaker will be Charles E. Mongan, M.D., Harvard Medical School, his address: 24 Central Street, Somerville. His subject will be, "Workmen's Compensation Act". All physicians are cordially invited, and it is hoped that a large number will be present.

The usual luncheon will be served.

SOCIETY MEETINGS

Combined Meetings of the Boston Medical Library, the Suffolk District Medical Society, the Middlesex South District Medical Society and the Norfolk District Medical Society

November 21, 1928—Meeting in association with Norfolk District Medical Society at the Boston Medical Library, at 8 P. M. Dr. Frederick W. O'Brien will read the paper entitled "Recent Advances in Physical Therapy" and Dr. Edwin T. Wyman will open the discussion.

December 19, 1928—Surgical Section. Symposium on Stomach Surgery. "Operative Procedures: Indications and Results," Dr. R. H. Miller; "Selection and Management of Patients for Gastric Surgery," Dr. H. M. Clute; "Acute Perforations of Stomach and Duodenum," Dr. W. R. Morrison; "Results of a Series of Stomach Operations," Dr. E. S. Emery, Jr. Discussion by Doctors David Cheever, Edward P. Richardson, Frank H. Lahey and I. J. Walker.

January 30, 1929—General meeting in association with Boston Medical Library. "Heredity," Professor George H. Parker, Harvard University.

February 27, 1929—Medical Section. "The Newer Knowledge of Nutriment," Dr. Lafayette B. Mendel (exact title to be submitted later), Yale University Medical School.

March 27, 1929—Meeting in association with Middlesex South District Medical Society. Clinical and Experimental Studies of Obstructing Jaundice and Its Complications. Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

The medical profession is cordially invited to attend all these meetings.

November 16, 1928—Massachusetts Society for Mental Hygiene. Detailed notice on page 964, issue of November 8.

November 19, 1928—Boston Medical History Club. Complete notice appears above.

November 20, 1928—New England Ophthalmological Society. See page 1016 for complete notice.

November 20—South End Neighborhood Medical Club. Detailed notice appears above.

November 26—Berkshire County Medical Society. Detailed notice appears on page 965, issue of November 8.

November 26-28—The National Society for the Prevention of Blindness. For detailed notice see page 1016.

DISTRICT MEDICAL SOCIETIES

Barnstable District Medical Society

Schedule of Meetings: February 7, 1929, May 2, 1929.

Bristol North District Medical Society

April 18, 1929—Spring meeting.

Essex North District Medical Society

January 2, 1929 (Wednesday)—Semi-annual meeting at Haverhill, at 12:30 P. M.

May 1, 1929 (Wednesday)—Annual meeting at Lawrence, at 12:30 P. M.

May 2, 1929 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill, at 2 P. M. (Tel. 3430.)

Essex South District Medical Society

December 5, 1928 (Wednesday)—Beverly Hospital. Clinic at 5 P. M. Dinner at 7 P. M. Speaker: Dr. Fred H. Albee, Sc.D., F.A.C.S., Professor of Orthopaedic Surgery, New York Post Graduate Medical School. Subject: Automatic Machinery in Bone Surgery. Discussion by Drs. H. C. Bean of Salem and C. Damsky of Lynn (10 minutes each). Discussion from the floor.

Franklin District Medical Society

Meetings will be held on the second Tuesday of November, January, March and May.

Hampshire District Medical Society

December 12—Address by Dr. Philemon Truesdale.

March 13, 1929—Address by Dr. George E. Gage, Professor of Bacteriology and Physiology at the Massachusetts State College.

Middlesex East District Medical Society

The following schedule of meetings has been arranged for the coming year:

January 16—Wakefield.
March—Reading.
May—Melrose.

Subjects and speakers to be arranged by committees in each city or town.

Middlesex North Medical Society

The winter meeting will be held the last Wednesday in January.

The annual meeting will be held the last Wednesday in April.

Middlesex South District Medical Society

March 27, 1929—Joint meeting with the Suffolk and Norfolk Districts.

April, 1929—Annual meeting. Definite date to be announced later.

Norfolk District Medical Society

Below are the proposed meetings of the Norfolk District Medical Society for the 1928-29 Season. The schedule below will be adhered to as strictly as possible. The carrying out of the proposed plan will, of course, depend upon the acceptances of invitations extended to the speakers. Minor changes may be necessary.

November 21—Boston Medical Library at 8 P. M. In combination with Suffolk District and Middlesex South District Societies. Subject, Recent Advances in Physical Therapy. Dr. Frederick W. O'Brien and Dr. Edwin T. Wyman.

January 29—Roxbury Masonic Temple. Subject, Treatment of Varicose Veins by the Injection Method—Dr. E. E. O'Neil. Dr. Homans will open the discussion.

February 25—Roxbury Masonic Temple. Dr. W. R. Ohler. Subject to be announced. Discussion to be opened by Dr. A. A. Hornor.

March 29 — Roxbury Masonic Temple. Subject and speakers to be announced.

May, 1929—Annual meeting program to be announced.

The Censors of the Society meet November 1, 1928, and May 9, 1929, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M., for the examination of candidates.

Plymouth District Medical Society

November 15, 1928—Meeting at the Lakeville Surgical Sanatorium, Lakeville, Mass. Special invitation of Superintendent Dr. Leon A. Alley; speakers who will address the meeting on special orthopedic subjects. Dinner served by the management of the Sanatorium.

January meeting, Thursday, January 17, 1929, at 11 A. M., Brockton Hospital, Brockton, Mass. Speakers: Dr. Michael F. Fallon, Chief of Surgical Staff, St. Vincent's Hospital, Worcester, Mass.; Dr. Edw. J. Denning, Chief of Medical Staff, Carney Hospital, Boston, Mass.; subject to be announced later.

March meeting at the Moore Hospital, Brockton, Mass., March 21st, program to be announced later.

April meeting at the Commercial Club, Brockton, April 18th, at 6 P. M. Annual Oration by Dr. Ralph C. McLeod, Orator; dinner.

Suffolk District Medical Society

March 27, 1929—Meeting in association with Middlesex South District Medical Society. "Clinical and Experimental Studies of Obstructive Jaundice and Its Complications," Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

LINCOLN DAVIS, M.D., President.

ARTHUR H. CROSBIE, M.D., Secretary.

Worcester District Medical Society

December 12, 1928—Chamber of Commerce, Worcester. Orthopedic Symposium.

January 9, 1929—Chamber of Commerce, Worcester. Dr. Leon T. LeWald of New York City.

February 13, 1929—Worcester State Hospital. Program to be announced.

March 13, 1929—Worcester City Hospital. Dedication of New Nurses' Home. Speaking program to be announced.

April 10, 1929—Grafton State Hospital. Program to be announced.

May 8, 1929—Annual meeting. Worcester Country Club.

Worcester North District Medical Society

January 22, 1929 (Tuesday)—At Henry Heywood Memorial Hospital, Gardner, by invitation. Program by Staff.

Annual meeting the fourth Tuesday in April.

BOOK REVIEWS

"Clinical Aspects of the Electrocardiogram". Second Edition. Revised. By HAROLD E. B. PARDEE, M.D. Published by Paul Hoeber, Inc., New York, 1924. 222 Pages.

The first edition was reviewed in this JOURNAL, November 20, 1924, Volume 191, Number 21, Page 988. The reviewer felt, at that time, that the volume filled a much needed gap in the medical literature of this country, and that it ought to become widely used by all those interested in electrocardiography. The intervening years have justified this opinion. During these years, the present reviewer has recommended this book to all physicians who have requested the easiest way to inform themselves about electrocardiography in relation to general clinical diagnosis. He has found that technicians can use it as a text book in learning routine interpretations of electrocardiograms, and he frequently has occasion to refer to it himself in the course of daily clinical use of electrocardiograms.

Present advances in the interpretation of electrocardiographic evidence of heart muscle pathology, and to a less degree slight improvements in the nomenclature of electrocardiographic diagnosis, and the development of new models of string galvanometers, justify the second edition.

The author is well equipped by clinical, technical and experimental work to write his book. He has expounded adequately and concisely normal and abnormal electrocardiograms in not more than one hundred and fifty easily read pages, well illustrated. In addition, there is a valuable chapter on clinical information to be derived from electrocardiograms, and another devoted to a lucid explanation of the theory of the electrocardiogram. The remainder of the book (55 pages) is introductory; description of various models of electrocardiographs and the technique of their operation; appendices; bibliography.

"Clinical Medicine." By OSCAR W. BETHEA.

The preface of this book states, "An effort has been made by the author to put into one volume of moderate size the latest and most generally accepted information as to the diagnosis and treatment of about one hundred of the most common diseases coming within the province of Internal Medicine. Unproven theory is omitted almost entirely." The book is admittedly not a complete treatise of the diseases considered. It is written for the general practitioner who is called upon to treat disease without the facilities of well equipped laboratories and hospitals. To the trained internist in the medical center it will appear superficial and incomplete and will not be a valuable asset to his library. It is rather distressing to find that some of the material has been taken from the publications of commercial biological laboratories, (e.g., the treatment of diabetes). For a quick resumé of the diseases covered it is good and the treatment advised is conservative and sound. Detailed prescriptions and formulae are given. To the busy doctor who wants facts without frills it will be valuable. It is published by W. B. Saunders Company.

Rene Theophele Hyacinthe Laennec. By GERALD WEBB, M.D.

There are many biographies of Laennec large and small. Dr. Webb in this short volume, however, has covered the ground pleasingly and well. There is a personal touch to his writing and one which shows the real feeling and almost reverence which the author must have had for the man whose life he is writing.

This book is well worth reading by all doctors and especially by those who are interested in the problem of tuberculosis.

BOOKS RECEIVED FOR REVIEW

Medical Dictionary. (1928.) Edited by Thomas Stedman. Published by William Wood & Co. 1194 Pages.

International Clinics. Edited by Henry Cattell. Published by J. B. Lippincott Company. 310 Pages.

A Laboratory Manual of Physiological Chemistry. Edited by D. Wright Wilson. Published by Williams & Wilkins Company. 272 Pages.

Surgical Diagnosis in Tabular Outline. Edited by A. J. Cemach. Published by F. A. Davis Company. 109 Tabular Forms and 129 Plates, with 548 Subjects.

Diseases of the Ear, Nose and Throat. Edited by Wendell Phillips. Published by F. A. Davis Company. 922 Pages.

Diseases of Infants and Children. Edited by Henry Chapin and others. Published by William Wood & Co. 675 Pages.

Essentials of Prescription Writing. Edited by Cary Eggleston. Published by W. B. Saunders Company. 153 Pages.

Text-Book of Surgery. Edited by W. Wayne Babcock. Published by W. B. Saunders Company. 1367 Pages.

Syphilis. Edited by Charles C. Dennie. Published by Harper & Brothers, Publishers. 304 Pages.

Urological Roentgenology. Edited by Hugh Young. Published by Paul B. Hoeber, Inc. 499 Pages.

Sinus Thrombophlebitis. Edited by Alfred Braun. Published by Paul B. Hoeber, Inc. 269 Pages.

The Validity of the Appraisal Form as a Measure of Administrative Health Practice. Edited by Philip S. Platt. Published by the American Public Health Association. 102 Pages.